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THE ABSORPTION OF DRUGS*

CARY EGGLESTON, M.D.
NEW YORK

Most of the drugs employed as therapeutic agents depend on their entrance into the blood stream, either in sufficient concentration or in sufficient total quantity, for the development of their therapeutic actions. Adequate knowledge of their absorption is therefore of fundamental importance to the development of a rational drug therapy. Modern textbooks on pharmacology, however, while discussing in detail the actions of each of the more important drugs, generally pass over the problems of their absorption with only a word or two, if, indeed, they mention them at all. Books and articles on therapeutics are usually even worse offenders. In fact, there seems to be a more or less general assumption that if a drug is soluble in water it will be absorbed in a satisfactory manner when introduced into the alimentary canal or injected into the subcutaneous or intramuscular tissues. A few seem to take the opposite stand, namely, that most drugs are absorbed so poorly from any channel of administration that, to secure therapeutic effects, they must be injected intravenously.

Both of these views are obviously erroneous, and I have chosen the absorption of drugs as the subject of my address with the hope of arousing interest in the investigation of its many problems rather than with the idea of throwing much light on them. Limitations of time and space restrict the scope of the discussion, and since the alimentary canal remains the commonest and most important site for the administration of drugs, I shall confine my remarks to considerations of absorption following oral administration, touching but briefly on absorption from the rectum.

The most recent review of the physiology of intestinal absorption [1] reveals the wide divergence of opinions as to its mechanism and concludes with the statement that "the mechanism of intestinal absorption is qualitatively explained by the known laws of osmosis." The process, however, may be modified by various physicochemical factors, and it has been shown [2] that the diffusion of water through a membrane depends for its direction and rate on a charge conferred on the water molecules by the membrane. This depends, further, on the chemical nature of the membrane and on the valence, concentration and sign of the charge of the ions which are in contact with it. Although our knowledge of the laws of physicochemical processes is as yet insufficient to explain all of the observed phenomena of intestinal absorption, it is unwise to cloak our ignorance in the well worn phrase, "vital activity." Recognizing the strides that have been made, we should, rather, be spurred to greater activity by the appreciation of the gaps that remain. Leaving the subject of the mechanisms involved in the physiology of absorption with this brief indication of their complexity and as yet unsettled status, I turn to problems of more immediate bearing on the therapeutic use of drugs.

SOLUBILITY AND ABSORBABILITY

The relation between the solubility of a drug in water and its absorbability is by no means so simple as is implied by the common statement that, since a particular modification of a drug is soluble, it is more readily absorbed than is another which is relatively insoluble. The subject has not received the consideration its importance merits, and many factors are involved in this seemingly simple relationship. Little attention seems to have been given to the fact that the fluid in the digestive tract is not water, but is a complex solution of varying composition and is capable of reacting with many drugs to render them soluble.

It is probable that many alkaloids are absorbed in the form of their readily soluble hydrochlorids, irrespective of the form in which they are administered, being converted in the stomach and first portion of the duodenum by the action of the free hydrochloric acid present. The average single dose of quinin and its salts is 0.6 gm. (10 grains). This dose of the hydrochlorid requires only 12 c.c. of water for its solution; the commonly used sulphate requires 500 c.c., and the alkaloid more than 900 c.c., yet it is well known that all three are absorbed with approximately equal rapidity and facility. The alkaloid quinidin, which demands 2,000 parts of water for solution, has recently been proved by Lewis [3] to be absorbed as rapidly by man as is its dihydrochlorid, which dissolves in 3.6 times its weight of water. Comparative studies on the absorbability of quinidin, its sulphate, bisulphate, and dihydrochlorid show that where any small time differences occur they bear no necessary relation to the question of solubility. It would be interesting to know the relative rates of absorption of these four compounds in patients with total achlorhydria and in normal persons, when introduced into the lower duodenum through a tube.

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* Chairman's address, read before the Section on Pharmacology and Therapeutics at the Seventy-Fourth Annual Session of the American Medical Association, San Francisco, June, 1923.

1. Goldschmidt, S.: Physiol. Rev. **1**: 421 (July) 1921.
2. Loeb, J.: J. Gen. Physiol. **1**: 717 et seq. (July) 1919.
3. Lewis, Thomas: Am. J. M. Sc. **163**: 781 (June) 1922.

Lewis also noted that the bisulphate (soluble in seven parts of water) was somewhat less rapidly absorbed than the other preparations. This is a suggestive observation, since it is an accepted fact that the intestinal mucosa is nearly impermeable to the sulphate ion. The bisulphate showed some delay in absorption, while the sulphate did not, and it is tempting to suggest that the difference is due to the fact that the former, being acid and containing twice the number of sulphate radicals, is less readily converted into the hydrochlorid by the dilute acid present in the stomach. Investigations should be undertaken with the corresponding quinin salts to test this theory.

The alkalis of the intestinal fluid below the first portion of the duodenum also play important rôles in facilitating the solution of many drugs, and the range of possibilities here is much greater than in the case of the gastric hydrochloric acid. Shortly after the insoluble barbital (veronal) was introduced into therapeutics, the readily soluble barbital sodium (medinal) was brought out with the claim that its solubility greatly enhanced the rapidity of its action on account of its more rapid absorption. Unpublished experiments by Hatcher and Eggleston showed that in animals there was no difference in the rates of absorption of these two drugs, and more accurate clinical observation reveals this to be true also in man. Both substances pass through the stomach without absorption, and, in the small intestine, barbital is probably rapidly converted into its sodium derivative, which promptly passes into solution and undergoes absorption. Many other illustrations of the influence of the composition of the intestinal fluid on solubility and absorption might be cited, such as the solution of acetylsalicylic acid (aspirin) and cinchophen.

The amount of fluid passed into the alimentary canal has been estimated to be about 9 liters a day, the greater part of which is being continually reabsorbed. This is a sufficient volume of fluid to dissolve a large amount of a relatively insoluble drug, even if it underwent no change which increased its solubility. Comparatively few drugs are given in larger single doses than 1 gm. (15 grains), yet there is enough fluid present to dissolve 6 gm. of a drug as insoluble as the alkaloid quinin. Under such conditions, however, it is necessary to take into consideration the degree of insolubility, the size of the dose, and the rapidity of absorption demanded in treatment.

Finally, certain properties of the drug itself in relation to its absorption may far outweigh the question of its solubility. Thus, among simple chemical compounds there are those to which the intestine is practically impermeable, such as the cathartic salts, all of which are freely soluble. Here the explanation of their resistance to absorption is simple, but the behavior of the more complex organic compounds offers many baffling problems. Among these, the relation between solubility in water and absorbability may be diametrically opposite to what would be anticipated. A striking example of such a reversed relation is found in ouabain (crystalline strophanthin) and crystalline digitoxin. Ouabain is readily soluble, yet is very poorly absorbed from the digestive tract, while digitoxin, which is almost insoluble, is readily absorbed.

Summing up the foregoing remarks, it may be said that the matter of solubility of a drug in water bears no necessary relation to the question of its absorbability from the gastro-intestinal tract.

INFLUENCE OF FOOD ON ABSORPTION

Consideration of conditions in the alimentary canal itself leads at once to the problems of the influence of food on absorption. During the processes of digestion, all of the activities of the mucosa are stimulated. Secretion of gastric and intestinal juices is enhanced, motility increases, the capillaries are dilated, and the local circulation is more rapid and more abundant. All of these factors increase the conditions favoring the solution of many drugs and at the same time enhance the general absorptive powers of the mucous membrane. Were these the only factors introduced by the presence of food, the absorption of drugs given with or immediately after meals would almost certainly be increased in both rate and completeness. But food may retard absorption, through too great dilution of a drug; by the large amount of colloid present; by combining with the drug to form a less absorbable compound, or in other ways. No general rules can be laid down, therefore, as to the influence of meals on the absorption of drugs, and this factor must be determined separately for each drug. The results of properly conducted studies of this problem should prove of great value to practical therapeutics.

The increased circulation during digestion may facilitate absorption, and it is probable that mild degrees of congestion from other causes have a similar effect. Several drugs have been shown to be absorbed more promptly when administered in dilute alcohol than when given in water. Other mild irritants, by inducing slight local congestion, will probably be found to produce the same result. If the drug itself is irritant, this property may facilitate its absorption if it is administered in sufficiently dilute solution. Higher degrees of local irritation, however, seem to delay absorption. Whether this is due to injury to the epithelium is not known, but such a mechanism seems probable. Inflammatory processes affecting the intestine may be expected to induce similar changes in absorption, but in general they probably tend to inhibit rather than to facilitate the process. It is well known, for example, that in the case of even a mild degree of peritonitis absorption may be brought to a virtual standstill. In inflammatory conditions, however, too many other alterations take place to permit of trustworthy analysis of this problem at present. Local ulceration of the mucosa, on the other hand, may enhance the absorption of some drugs, especially those toward which the membrane is normally more or less impermeable.

Anemia of the alimentary canal probably always impairs absorption of drugs as well as of the products of digestion. A diminished blood flow, either local or general, may act in the same direction, as suggested by the observation that the absorptive function of the digestive tract is impaired in athreptic infants.[4] On the other hand, even a high degree of stasis and congestion in the splanchnic area, as seen in the congestive type of heart failure, has little appreciable effect on the rate of absorption of digitalis.

The range and degree of the influence of these circulatory changes requires extensive investigation before any generalizations can be made with safety. Many studies of their influence on absorption from loops of intestine have been made in animals, but the conditions of study are too abnormal to justify the transference of the results to man.

4. Marriott, W. M.: Some Phases of Pathology of Nutrition in Infancy, Am. J. Dis. Child. **20**: 461 (Dec.) 1920.

Nausea is of frequent occurrence during illness and has as one of its phenomena the more or less prolonged closure of the pylorus. This delays the passage of the stomach contents into the duodenum, and might therefore be expected to retard the absorption of most drugs, since the duodenum and upper part of the small intestine are the regions from which absorption is most active. The importance of nausea in relation to absorption, however, seems to be limited to two classes of drugs. First, to those which are apparently absorbed only from the first portion of the duodenum, where the reaction is acid. This class is best represented by the alkaloids, which are probably absorbed to a very slight extent only after their precipitation by the alkalis of the small intestine. Second, to those drugs which are normally absorbed with great rapidity from the small intestine below the first part of the duodenum. When the rate of absorption is measured in minutes, the delay caused by the closure of the pylorus may be significant. But as the closure seldom continues uninterrupted for more than a few minutes at a time, its retarding influence on absorption is too slight to be noticed with most drugs. This has been proved to be the case, for example, with digitalis, the absorption of which requires from one to four hours. It is interesting, in this connection, to note that nausea probably has no other influence on the rate of absorption of drugs than that due to their increased time of retention in the stomach.

Little attention seems to have been given to the influence of gastro-intestinal disease on absorption, and much useful information may be expected from studies in this field.

The questions raised in the foregoing pages have dealt mainly with some of the factors that may affect the processes of absorption, and suggestions have been made as to the directions in which these several factors may exert their influences. The more abstruse problems of physical chemistry and the behavior of semipermeable membranes have purposely been omitted, because I wish to direct attention to problems which offer more immediate prospects of solution by methods more or less readily available in the hospital and at the bedside. Some of the succeeding problems are especially suitable for clinical investigation, and the results obtained should be of immediate application to therapeutics.

RATE OF ABSORPTION

The rate of absorption after oral administration may be determined for man in different ways. If the drug produces definitely determinable actions, the interval to the appearance of one or other of these may be taken as the measure of the rate of absorption. This method is peculiarly valuable to therapeutics, for it measures the time required for the absorption of an amount of the drug sufficient to produce one or more of its characteristic actions. It does not, however, show the maximal rate of absorption, nor does it reveal the course of absorption, which may vary from moment to moment, or the completeness of the absorption of a single dose. Despite these inherent shortcomings, the method has yielded most satisfactory results, and it should be applied, under conditions of adequate control, to the investigation of a number of drugs. Its relative ease of application to man should especially commend it to the attention of the clinician.

The time of appearance in the urine following oral administration may also be used to measure the rate of absorption of many drugs. Drugs suitable for this method of study, however, must be excreted in the urine in detectable form. The rapidity of their appearance after injection into the blood stream should also be known. If, in addition, the proportion of an intravenous dose which is eliminated by the urine has been determined, it is also possible to approximate the extent as well as the rate of absorption from the alimentary canal. This method has been employed extensively in studies on the absorption and elimination of the iodids, and it should be extended to the study of many other drugs which have not yet been adequately investigated, perhaps largely because of minor technical difficulties associated with their detection.

Where tests are available for the detection of small amounts of a drug in the blood stream, the rate of absorption can be measured quite precisely by determining the time of the first appearance of the drug in blood drawn from a vein. When quantitative tests can be applied, the course of absorption can be determined, as well as its approximate completeness. Theoretically, this is the ideal method, but unfortunately it is possible to apply it to only a limited number of drugs, and the technic of recovery of a drug from the blood is often quite complicated, difficult, and fraught with many sources of error. Further work along such lines, however, should materially extend the possibilities of this method. In this connection, it should be borne in mind that most drugs leave the blood stream within a few minutes, so that quantitative studies of absorption will usually have to depend on the determination of curves of concentration, based on series of tests made at increasing intervals of time after administration. Such frequent taking of blood samples, however, is a serious disadvantage of the method.

One or another of these methods has been followed in the study of the absorption of a few drugs, such as the digitalis bodies, quinidin, the iodids and the salicylates. In each instance, the results obtained have materially improved the therapeutic application of the drugs in question. In view of the success that has followed these investigations, it is remarkable that efforts have not been made to apply similar methods to a variety of other drugs in common use. It is to be hoped that such studies will be undertaken in the near future. If as much energy were expended along these lines as has been devoted to the subject of intravenous medication, there would truly be but small need for attention to the latter fad.

UNIFORMITY OF ABSORPTION

The degree of uniformity of absorption is just as important as is the rate, and is determinable by the procedures outlined. This too, however, is a subject to which little careful attention has been directed by both pharmacologists and clinicians, yet it lies at the very root of a rational drug therapy. Uniformity of absorption must be considered from two points of view: that of rate and that of certainty in different individuals or on different occasions in the same individual. The intestinal mucosa, particularly in the duodenum, probably absorbs the first portion of many drugs quite rapidly and then slows down so that absorption of the last portions is much delayed. Evidence favoring this view is found in several studies made on ligated loops of intestine. The mechanism of such a process is probably determined by many factors, as yet chiefly speculative. Succeeding portions of the intestine probably also differ in their capacity to absorb most drugs, so that the rate of absorption may

vary with the onward movement of the intestinal contents. This phase of the subject, however, is relatively unimportant as compared with that of certainty, for it makes but little difference whether or not a drug is absorbed at a fixed rate, while it is of the utmost value to know whether or not a drug can be relied on to be absorbed with a reasonable degree of certainty. If it cannot, its therapeutic value must always remain a matter of considerable speculation. Lack of certainty of absorption of strophanthus, for example, is the sole reason why it cannot be given orally to man with sufficient safety to permit its use.

ABSORPTION FROM RECTUM

So far I have confined my remarks to absorption following oral administration. Absorption from the rectum offers most of the problems reviewed, and investigations of this subject are even more meager than are those concerned with absorption from other channels. Some drugs seem to be taken up from the rectum quite as rapidly and as effectively as when given by mouth, some possibly better; but most are probably much less satisfactorily absorbed. Except in a few isolated instances there are no trustworthy data on rectal absorption and on the relation between the rectal and oral doses. It has been suggested that, as the lower hemorrhoidal veins empty into the inferior vena cava, drugs absorbed through them might be effective in smaller doses than by mouth, since they avoid passage through the liver. This suggestion lacks substantiation, but is worthy of special investigation, as is, in fact, the whole subject of the rectal administration of drugs.

The liver is capable of fixing and destroying or otherwise eliminating a great many drugs. This fact has been used as one of the arguments against oral administration, as compared with other methods, since drugs so given generally enter the systemic circulation only after initial passage through the liver. A few drugs may be absorbed through the lymph channels and escape immediate carriage to the liver. The argument theoretically is weighty, but, unfortunately for those who advance it, it is abundantly controverted on every side by general clinical experience. The time required for destruction or fixation by the liver has been left out of account. This may vary from a few minutes to many hours, as has been demonstrated in animals. Even with a drug that is fixed or destroyed rapidly, a more or less considerable proportion will usually escape change in the liver and enter the general circulation. The oral dose of such a drug will, therefore, merely have to be made sufficiently large to allow for the portion which is destroyed during the first passage through the liver. This will almost certainly mean that the oral dose will be materially greater than that for subcutaneous or intramuscular injection, but does not necessarily render either of the latter methods preferable to the former.

A point of much greater importance in this connection, however, is the relation between the rate of absorption from the intestine and the rate of removal by the liver. On this subject there is almost no information, but the fact that most drugs are more or less effective by mouth suggests that the rate of liver destruction is generally considerably slower than is that of intestinal absorption. Certainly the assumption that liver fixation or destruction is a serious bar to effective oral administration is not warranted by the common experience of therapeutists.

This brings me to the last problem of which I wish to speak—that of the relation between the rate of elimination and the duration of action of a drug on the one hand and the rate of its absorption from different channels of administration on the other. This relationship, more than any other factor, determines the mode of administration, the dosage and the frequency of repetition of drugs, except for those few agents whose actions may prove life-saving in circumstances of great urgency, such as strophanthin in cardiac failure and epinephrin in shock. Important as this relationship is in therapeutics, it has seldom been the subject of systematic investigation. Until much more definite information is available, oral administration must unquestionably remain the most satisfactory and the most precise method.

The dose of a drug may be defined as that amount which will just suffice to produce the desired effect in a given patient under the particular existing conditions. This dose cannot be known in advance, for it is not the same in different patients, nor even in the same patient at different times. By oral administration, fractions of this dose can be given as often as necessary, until the desired dose is absorbed and the action sought has been developed. By varying the size of the fractions and the frequency of repetition, the required dose can be approximated with greater certainty and precision than by any other method, and the rapidity with which the effects are developed may also be controlled with some degree of accuracy.

CONCLUSION

Finally, let me repeat that it has been my endeavor to arouse a more general interest in the manifold problems of the absorption of drugs on the part of both pharmacologists and clinicians. I am well aware that many points have been omitted from the foregoing discussion, and that many have been treated in a brief and sketchy manner, largely because of the dearth of facts. But it is just this tremendous lack of precise knowledge that has led me to bring the subject to your attention. I regard it as a reproach to men who profess to follow a learned calling that they should ignore a subject so fundamental as the absorption of the drugs which they daily administer. If I have been able to awaken in you the desire to investigate some of the problems mentioned, I shall feel that my task has been accomplished.

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Opsonins.—Realizing that there was a more definite basis for phagocytosis than was embraced in the older conceptions, Wright introduced the idea of opsonins to designate the presence in the blood serum of substances which render the various bacteria subject to phagocytosis. The normal blood serum contains such opsonic material for the various bacteria with which it may be infected, but this varies greatly toward the different organisms. Thus we may find individuals showing much more opsonin (a higher opsonic index) toward one organism than toward another. This explains, in a way, the well known fact that different people are variably susceptible to the same disease, while the same individual may be strongly resistant toward infection with one organism, but easily a victim of another infection. Regarding their chemical nature very little is known. There seems to be a certain amount of evidence which points to the fact that these opsonins belong to the class of globulins, while Simon and Lamar have shown that they are apparently associated with the euglobulin fraction. . . . The opsonins are thermolabile and are usually destroyed by heating for ten minutes to 60 C.—Webster: Diagnostic Methods, Philadelphia, P. Blakiston's Son & Co., 1923.

SOME TOXIC EFFECTS OF DIGITALIS*

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The administration of digitalis in the treatment of heart affections may be said to have been revolutionized since the work of Eggleston [1] in 1915. This student of digitalis has demonstrated that it is possible to use the body weight of the patient for the estimation of the approximate total amount of the drug which would be required to obtain its therapeutic effects. The question of dosage in the use of digitalis has at last been put on a sound basis. There is abundant evidence that the "Eggleston method" of digitalis administration has been of great benefit to those in need of its action, and the question arises whether any harm has resulted from the larger dosage which the method implies.

Opportunity has been afforded in the heart laboratory of the Boston City Hospital to study the effect of digitalis on a large number of patients. A variety of untoward results have been observed, and it is my purpose to report certain of these, with some discussion of their significance.

It is desirable, at this point, to emphasize that the average case of heart disease was successfully treated, but this report deals with those in which toxic effects were observed. Their nature was sufficiently important to warrant publication, but the reader is cautioned against passing judgment on the quality of the therapy administered in a large metropolitan hospital.

THE EGGLESTON METHOD OF DIGITALIS ADMINISTRATION

In prescribing digitalis according to the method of Eggleston, digitalization, i. e., the full therapeutic effect of the drug, may be obtained when the patient has been given 0.15 cat unit per pound of body weight. Hatcher and Eggleston [2] have shown that, when using digitalis preparations of standard potency, there is one cat unit to 1 c.c. of the tincture, 0.1 gm. of the leaf, and 10 c.c. of the infusion, respectively. More recently, Eggleston and Wyckoff [3] have changed the dosage recommended to 0.1 cat unit per pound of body weight of the patient.

The arithmetic necessary to calculate the amount of the drug needed to digitalize a patient has become, therefore, very simple. The approximate amount will be 1 c.c. of the tincture, or 0.1 gm. of the leaf [4] for each 10 pounds of body weight of the patient. This is accomplished by the simple procedure of inserting, in the figure representing the patient's weight in pounds, one decimal for the tincture, and two for preparations of the dried leaf. Thus, if the patient weighs 156 pounds, the approximate dose at which digitalization may be expected would be 15.6 c.c. of the tincture and 1.56 gm. of the dried leaf. Many of the preparations, such as digitan (digipuratum), are put up in pills containing 1 decigram (0.1 gm. or 1½ grains), and therefore, in the case just cited, one would give 15.6 of the pills. When using pills not of the 0.1 gm. strength the number of pills required would, of course, be that of which the sum of the digitalis content equaled the number of grams of the leaf in the original calculation, i. e., 1.56 gm. in the example cited.

The studies of Pardee [5] have shown that the body disposes daily, on an average, of 22 minims of the tincture of digitalis of standard potency. It is necessary, therefore, when the administration of the drug is continued over a series of days, to subtract the amount that may be estimated to have been eliminated, or otherwise disposed of, in order to ascertain the total amount of digitalis which may be considered active in the patient at any one time. There are, it is true, considerable variations from one individual to another in the rate at which digitalis is used up; Pardee encountered as low a daily rate as 10 minims, and as high as 40 minims. For the purpose of analysis of the digitalis therapy in the cases to be reported below, 22 minims, or 1.5 c.c. will be deducted for each day that the drug was administered. It is admitted that if the individual patient happened to dispose of the drug at a higher or lower rate, an error will unavoidably affect the calculations. This error, however, will be relatively small in the courses covering but a few days; and, since the amount of digitalis given was usually large, it does not appear to affect seriously the estimation of the total digitalis active in the patients.

The following cases have been selected from those seen during the past two years' work of the heart laboratory of the Boston City Hospital. They do not comprise all in which toxic effects were noted; many had to be excluded, owing to the absence of certain details, such as a statement of the body weight or a sufficiently accurate record of the digitalis administration. The work is not offered as being comparable to such a carefully controlled study as that of Eggleston and Wyckoff,[3] but, on the other hand, it is believed that a comparison of these clinical observations to the more accurate data reported by the authors referred to is not without considerable practical value. No attempt is made to include all of the toxic effects of the drug; they have already been well described by other observers, and reviewed by Robinson.[6]

COUPLED RHYTHM

CASE 1.—*History.*—A woman, aged 55, whose condition was diagnosed as auricular fibrillation, the type of heart disease being undetermined (probably arteriosclerotic), developed coupling on the eighth day of treatment, which was associated with extreme nausea and a little vomiting. The digitalis was omitted, and the symptoms and coupling disappeared after three days.

Digitalis Record.—The weight of the patient was 132 pounds (60 kg.). She was given 4 c.c., and then 4 c.c. a day, in divided doses, for eight days. The total amount of digitalis given was 36 c.c. Subtracting 12 c.c. leaves 24 c.c. as the amount of digitalis available in the patient at the time of the coupled rhythm. Twenty-four c.c. equals 181 per cent. of 13.2 c.c., the amount indicated for digitalization by the Eggleston method of calculation.

CASE 2.—*History.*—A woman, aged 64, whose condition was diagnosed as arteriosclerotic heart disease, with auricular fibrillation, developed coupled rhythm and vomiting on the eighth day. The digitalis was omitted, and the coupling ceased after one week.

Digitalis Record.—The weight of the patient was 105 pounds (47 kg.). She was given 4 c.c. a day, in divided doses, for seven and one-half days. The total digitalis given amounted to 30 c.c. Subtracting 11.2 c.c. leaves 18.8 c.c., which is 179 per cent. of the 10.2 c.c. indicated.

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* From the Heart Laboratory of the Boston City Hospital.
* Read before the Section on Practice of Medicine at the Seventy-Fourth Annual Session of the American Medical Association, San Francisco, June, 1923.

1. Eggleston, Cary: Digitalis Dosage, Arch. Int. Med. **16**: 1 (July) 1915.
2. Hatcher and Eggleston: Observations on the Keeping Properties of Digitalis and Some of Its Preparations, Am. J. Pharm. **85**: 203, 1913.
3. Eggleston, C., and Wyckoff, J.: The Absorption of Digitalis in Man, Arch. Int. Med. **30**: 133 (Aug.) 1922.
4. I do not use the infusion, nor was it employed in the cases reported here; so further mention of it will not be made in this paper.
5. Pardee, H. E. B.: Principles of New Method of Administering Digitalis, New York M. J. **110**: 1064 (Dec. 27) 1919.
6. Robinson, G. C.: The Therapeutic Use of Digitalis, Medicine **1**: 1 (May) 1922.

CASE 3.—*History.*—A man, aged 45, whose condition was diagnosed as rheumatic heart disease, with auricular fibrillation and mitral involvement, developed coupled rhythm on the eighth day. Digitalis was omitted, and the coupling disappeared in five days.

Digitalis Record.—The weight of the patient was 175 pounds (79 kg.). He was given 2 c.c., and then 8 c.c. a day, in divided doses, for eleven days. The total amount of digitalis given was 90 c.c. Subtracting 16.5 c.c. leaves 73.5 c.c., which is 420 per cent. of the 17.5 c.c. indicated.

CASE 4.—*History.*—A man, aged 52, whose condition was diagnosed as Pick's disease (chronic multiple serositis), arteriosclerosis and heart failure of the congestive type, developed atrioventricular rhythm and ventricular extrasystoles, which caused a coupled rhythm on the fifth day, and persisted for three days after the omission of the digitalis.

Digitalis Record.—The weight of the patient was 140 pounds (63 kg.). He was given 8 c.c., and then 3 c.c. a day for four days. The total amount of digitalis given was 20 c.c.[7] Subtracting 6 c.c. leaves 14 c.c., which is 100 per cent of the 14 c.c. indicated.

In these four cases, the amount of digitalis given bears to the calculated amount, of 1 c.c. to every 10 pounds of body weight, the relation of 181, 179, 420 and 100 per cent., respectively. The occurrence of a coupled rhythm in Case 4, although the calculated dosage of digitalis had not been exceeded, is noteworthy. This man's heart is evidently prone to develop arrhythmias, for various subsequent electrocardiograms have shown atrioventricular rhythm, intraventricular block, and auricular fibrillation. Patient 16, in the report of Eggleston and Wyckoff,[3] developed coupled rhythm at a dosage estimated to be close to that of therapeutic digitalization.

ACCELERATED SINUS RATE WITH PARTIAL HEART BLOCK

CASE 5.—*History.*—A woman, aged 33, whose condition was diagnosed as convalescence from influenza, and visceroptosis, developed symptoms of weakness, palpitation and precordial pain of moderate severity. The cardiac and general physical examinations were fully normal, save for evidence of poor nutrition and visceroptosis. With the exception of tonsillitis, there was no history of disease of etiologic significance as regards heart disease. The blood Wassermann reaction was negative. All symptoms were of recent origin; a cough with moderate expectoration persisted. Three basal metabolism tests were reported as + 17, + 13.3 and + 14.2 per cent., respectively.

Digitalis was administered, and the heart rate, which had been from 90 to 100, rose to from 130 to 140 without irregularity. On the third day, vomiting and much prostration appeared; the patient was very apprehensive. Examination revealed the heart to be 138; the rhythm was regular, excepting for occasional short periods when the rate was halved. Pressure on the left vagus readily slowed the rate to 69, but the moment the compressing finger was removed, the original rate of 138 returned. On the basis of the regular tachycardia so readily relieved by vagal pressure, my clinical diagnosis was paroxysmal tachycardia of auricular origin, or possibly auricular flutter with a varying degree of heart block. The electrocardiogram showed a sino-auricular tachycardia with a partial auriculoventricular heart block, causing a variation from a 1:1 to a 2:1 rhythm. The P-R interval varied from 0.28 to 0.36 second, or a failure of the ventricle to respond to the auricular impulse. On discontinuance of the digitalis, the vomiting and prostration disappeared in from twelve to eighteen hours, and normal rhythm was resumed after about two days.

Digitalis Record.—The weight of the patient was 108 pounds (45 kg.). She was given 4 c.c., and then 1 c.c. from three to five times a day, for three days. The total amount of digitalis given was 12 c.c. Subtracting 3 c.c. leaves 9 c.c., which is 83 per cent. of the 10.8 c.c. indicated.

CASE 6.—*History.*—A man aged 61, whose condition was diagnosed as hypertensive heart disease and chronic nephritis, on the third day of digitalis therapy experienced a change in the heart rhythm to a regular irregularity; there were periods of heart beats at the rate of 73 a minute, alternating with others at a frequency of 48. The irregularity was present only when the beats shifted from the higher to the lower rate, or vice versa. It was clear that dominant rhythm was still present, and fibrillation of the auricles could be excluded. Auricular flutter was considered the probable diagnosis, but the graphic record showed a sino-auricular tachycardia with partial auriculoventricular heart block. The auricular rate was 146 a minute, while that of the ventricle alternated between 73 and 48.6, according to whether the latter responded to every second or third auricular impulse. The digitalis was omitted, and the arrhythmia ceased after a few hours. Eighteen hours later, the polygram showed normal rhythm with a rate of 78, and an a-c interval just under 0.3 second (the maximum normal).

Digitalis Record.—The weight of the patient was 140 pounds (63 kg.). He was given 2 c.c., and then the same dose five or six times a day for two and one-half days. The total amount of digitalis given equaled 26 c.c. Subtracting 3.75 c.c. leaves 22.25 c.c., which is 159 per cent. of the 14 c.c. indicated.

These two cases are of interest because of the unusual effect of digitalis. The clinical imitation of paroxysmal tachycardia or auricular flutter was striking. The occurrence of partial heart block during digitalis therapy is common but, so far as I am aware, the elevation of the rate at which the sino-auricular node initiates impulses is very rare. A similar action was noted by Halsey[8] in experimental work on dogs. He found that occasionally, with or without previous slowing or the occurrence of ectopic beats, digitalis caused a marked acceleration of the sinus rate.

The first patient was obviously very intolerant to digitalis, the dosage of which was slightly less than that calculated for her body weight. The elevation of the basal metabolism in the three determinations was not, in my opinion, sufficiently great to justify a positive diagnosis of hyperthyroidism. There were various features in the clinical picture and in the presence of a subsiding acute infection to suggest that the vagus nerve was in an abnormal condition and particularly susceptible to the influence of digitalis. Even if the assistance of an electrocardiogram had not been available, the appearance of excessive vomiting was a good clinical guide for the cessation of the administration of digitalis.

Patient 6 was benefited by several courses of digitalis during his long stay in the hospital, and displayed this unusual arrhythmia but once. At the time of the sino-auricular tachycardia and partial heart block, he was nauseated and prostrated, but did not vomit.

AURICULAR FIBRILLATION

CASE 7.—*History.*—A man, aged 56, whose condition was diagnosed as hypertensive heart disease, had partial heart block (P-R interval, 0.24 second) on the thirteenth day and auricular fibrillation on the twenty-fifth day. Digitalis was omitted, but the fibrillation of the auricles continued.

Digitalis Record.—The weight of the patient was 154 pounds (70 kg.). He was given an average of 6.6 c.c. a day for twenty-five days. The total amount of digitalis given was 153.8 c.c. Subtracting 37.5 c.c. leaves 116.3 c.c., which is 755 per cent. of the 15.4 c.c. indicated.

7. In this and in some of the subsequent reports, the total amount of digitalis differs, owing to the omission of some doses for reasons such as that the patient was asleep. I have excluded all cases save those in which I am certain of the amounts given.

8. Halsey, J. T.: The Digitalized Dog's Heart as Affected by Amyl Nitrite or Atropine, Studied Electrocardiographically, J. Exper. Med. 25: 729 (May) 1917.

CASE 8.—*History.*—A man, aged 38, whose condition was diagnosed as cardiovascular syphilis, marked heart failure and aortic insufficiency, and in whose case an electrocardiogram on the second day showed: partial auriculoventricular heart block (P-R interval, 0.26 second), intraventricular block (right bundle branch), occasional ventricular extrasystoles, and a heart rate of 75, was given digitalis. On the ninth day its administration was discontinued, owing to toxic symptoms. The electrocardiogram disclosed auricular fibrillation, intraventricular block and a ventricular rate of from 50 to 69. Normal rhythm returned after about one week.

Digitalis Record.—The weight of the patient was 160 pounds (73 kg.). He was given digitalis in divided doses for nine days. The total amount of digitalis given was 75 c.c. Subtracting 13.5 c.c. leaves 61.5 c.c., which is 384 per cent. of the 16 c.c. indicated.

It cannot be stated with conviction that in the foregoing two cases digitalis and the onset of the auricular fibrillation bear the relation to each other of cause and effect. However, such a relationship has been observed in experimental work [9] on animals, and in man, Danielopolu [10] has reported three cases, and Mackenzie,[11] one. As noted by these observers, the onset of the fibrillation occurred at the height of the digitalis effect; in fact, only after enormous doses had been taken. The work of Lewis [12] and his co-workers on the nature of auricular flutter and fibrillation disclosed data about the action of vagal stimulation on the auricular tissue which make the appearance of auricular fibrillation as a result of an intense digitalis-induced stimulation of the vagus nerve seem more easy to credit.

PAROXYSMAL TACHYCARDIA OF VENTRICULAR ORIGIN

CASE 9.—*History.*—A woman, aged 50, whose condition was diagnosed as auricular fibrillation, probably associated with hypertensive heart disease, was nauseated on the third day, and vomited slightly on the fifth day; paroxysms of tachycardia arising in the ventricle appeared on the fifth day and soon became permanent. Death from progressive heart failure ensued on the seventh day.

Digitalis Record.—The weight of the patient was 200 pounds (90 kg.). She was given 8 c.c., and then divided doses for four and six-tenths days. The total amount of digitalis given was 50 c.c. Subtracting 6.9 c.c. leaves 43.1 c.c., which is 215 per cent. of the 20 c.c. indicated.

CASE 10.—*History.*—A man, aged 63, whose condition was diagnosed as arteriosclerotic heart disease, with auricular fibrillation, developed slowing of the heart and occasional extrasystoles on the second day, vomited twice on the fourth day, had ventricular tachycardia on the fifth day, and died suddenly during the succeeding night.

Digitalis Record.—The weight of the patient was 160 pounds (72 kg.). He was given 16 c.c., and then 2 c.c. from four to six times a day for five and three-tenths days. The total amount of digitalis given was 88 c.c. Subtracting 8 c.c. leaves 80 c.c., which is 500 per cent. of the 16 c.c. indicated.

CASE 11.—*History.*—A woman, aged 88, whose condition was diagnosed as arteriosclerotic heart disease, with auricular fibrillation, had marked edema of the dependent parts. On the second day, the heart rhythm suddenly became regular, with a rate of 160. On the morning of the third day, the electrocardiogram showed the rhythm to be paroxysmal tachycardia of ventricular origin; this changed to ventricular fibrillation, and the patient died suddenly.

Digitalis Record.—The weight of the patient was 135 pounds (61 kg.) before the onset of the edema. She was given 4 c.c., and then 2 c.c. in repeated doses for two days. The total amount of digitalis given was 23 c.c. Subtracting 3 c.c. leaves 20 c.c., which is 148 per cent. of the 13.5 c.c. indicated. (The ventricular tachycardia appeared after only 11 c.c. of digitalis had been taken, but there is a great probability that the drug had already been administered by the patient's physician before admission to the hospital.)

CASE 12.—*History.*—A man, aged 47, whose condition was diagnosed as auricular fibrillation and myocardial insufficiency, the type of heart disease being undetermined, developed paroxysmal tachycardia arising in the ventricle on the morning of the fifth day. The duration of the individual paroxysms was usually less than one minute. The digitalis was omitted, and after about twenty-four hours, the runs of ventricular tachycardia ceased. The underlying rhythm of auricular fibrillation with ventricular extrasystoles persisted until the patient died two months later.

Digitalis Record.—The weight of the patient was 190 pounds (86 kg.). He was given 12 c.c., and then divided doses until the fifth day. The total amount of digitalis given was 49 c.c. Subtracting 6 c.c. leaves 43 c.c., which is 226 per cent. of the 19 c.c. indicated.

CASE 13.—*History.*—A woman, aged 60, whose condition was diagnosed as auricular fibrillation, with probably arteriosclerotic heart disease, on the fifth day had nausea, prostration and paroxysmal tachycardia of ventricular origin. The administration of digitalis was omitted, and the paroxysms, of an average duration of several hours, ceased after three days. Death from persistent heart failure occurred one week later.

Digitalis Record.—The weight of the patient was 155 pounds (70 kg.). She was given 8 c.c., and then divided doses for five days. The total amount of digitalis given was 35.3 c.c. Subtracting 7.5 c.c. leaves 27.8 c.c., which is 179 per cent. of the 15.5 c.c. indicated.

These five cases of paroxysmal tachycardia of ventricular origin are of decided interest. In view of the paucity of reports of this arrhythmia, the cases will be reported in more detail in a subsequent paper.

Ventricular ectopic tachycardia has been noted in experimental work, such as that of Levine.[13] Case 16 in the series of patients studied by Eggleston and Wyckoff [3] showed this rhythm following the administration of digitalis. A good recovery followed. Levy [14] and Oppenheimer and Mann [15] observed ventricular tachycardia in the course of quinidin therapy. More recently, Schwensen [16] of Copenhagen reported two cases, ending in death, which he attributed to the action of digitalis. Robinson and Herrmann [17] have emphasized the frequent association of paryoxysmal tachycardia of ventricular origin with an infarct of the coronary artery, and have pointed out that the diagnosis requires proof by an electrocardiogram, and that, even then, the differentiation from paroxysmal tachycardia arising in the auricle is not always certain.

The occurrence of ventricular ectopic tachycardia, though rare, is of distinct practical importance. In each case, the appearance of a regular tachycardia during the treatment of auricular fibrillation caused a clinical diagnosis of auricular flutter to be entertained. If correct, then the usual decision would be to administer more digitalis in the hope of at least slowing the ventricular rate. It need hardly be argued that if more digitalis is given to a patient in whom the drug has already caused ventricular ectopic tachycardia,

9. Lewis, Thomas: The Mechanism and Graphic Registration of the Heart Beat, New York, Paul B. Hoeber, 1920, p. 343.
10. Danielopolu: Arythmie complète chèz l'homme provoqué par la digitale: rôle du systeme modérateur, Bull. et mém. Soc. de biol. **79**: 97, 1916.
11. Mackenzie: New Methods of Studying Affections of the Heart, III, Action of Digitalis on the Human Heart, Brit. M. J. **1**: 702, 1905.
12. Lewis, Thomas: Heart **7**: 117, 127, 131 (April); 293 (Aug.) 1920; **8**: 193 (May) 1921.
13. Levine, S. A.: The Action of Strophanthin on the Living Cat's Heart, J. Exper. Med. **29**: 485 (May) 1919.
14. Levy, R. L.: Clinical Studies of Quinidin, Arch. Int. Med. **30**: 451 (Oct.) 1922.
15. Oppenheimer, B. S., and Mann, Hubert: Results with Quinidine in Heart Disease, abstr. J. A. M. A. **78**: 1752 (June 3) 1922.
16. Schwensen, C.: Ventricular Tachycardia as a Result of the Administration of Digitalis, Heart **9**: 199 (April) 1922.
17. Robinson, G. C., and Herrmann, G. R.: Paroxysmal Tachycardia of Ventricular Origin, and Its Relation to Coronary Occlusion, Heart **8**: 59 (Feb.) 1921.

a serious error is made, and the possibility of the death of the patient is increased.

CONTROL CASES

As far as the foregoing thirteen cases are concerned, it would appear that the dosage was usually far in excess of that needed to produce the maximum therapeutic effect according to the Eggleston method of computing the amount in relation to the weight of the patient in pounds. The question promptly arises, however, as to the potency of the tincture of digitalis administered. A very good answer to this question should be obtainable from the results on other patients treated with the same preparation.

Consequently, I have selected nine patients in whom there occurred marked slowing of the ventricular rate, often with the removal or considerable reduction of the pulse deficit, and a definite reduction in the T wave in Lead 2 of the electrocardiogram. Both of these are generally conceded to be reliable criteria of the therapeutic action of digitalis. There was in addition ample clinical evidence of the therapeutic effect of the drug.

A glance at Table 2 will best show the results. In Cases 16 and 18, in which two courses of digitalis were given, the difference in the amount of the drug administered may well be explained by the fact that the larger totals coincide with the longer courses. This permits a greater reduction in the total effective digitalis if these patients happen to have a higher rate of excreting or other disposal of the drug. Thus, it should be recalled that Pardee [5] showed that in some patients the daily using up of digitalis was as high as 40 minims, while the calculations used in this paper have been based on the average rate of 22 minims.

In Cases 21 and 22, and particularly in the latter, the totals are well over the expected amounts. In Case 22, since vomiting was present, it is probable that

TABLE 1.—*Cases Showing Toxic Effects*

Case No.	Body Weight, Pounds	Total Digitalis C.c.*	Relation to Amount Calculated by Eggleston Method Per Cent.	Number of Days to Course of Digitalis
COUPLED RHYTHM				
1	132	24	181	8
2	105	18.8	179	7.5
3	175	73.5	420	11
4	140	14	100	4
PARTIAL HEART-BLOCK WITH ACCELERATED SINUS RATE				
5	108	9	83	2
6	140	22.25	159	2.5
ONSET OF AURICULAR FIBRILLATION				
7	154	116.3	755	25
8	160	61.5	384	9
VENTRICULAR ECTOPIC TACHYCARDIA				
9	200	43.1	215	4.6
10	160	80	500	5.3
11	135	20†	148†	2†
12	190	43	226	4
13	155	27.8	179	5

* After subtraction of 1.5 c.c. daily for the number of days the drug was administered.
† Patient probably had digitalis, amount unknown, before admission to the hospital.

the point of maximum therapeutic action of digitalis was exceeded, but also it seems necessary to consider an insusceptibility of this patient's heart to the drug, or a poor rate of absorption from the intestinal tract.

It is also emphasized that the cases cited as controls were not originally studied with the idea of ascertaining the exact moment at which the maximum therapeutic effects of digitalis were first present. They should not be considered, therefore, as presenting the same degree of accuracy as those reported by Eggleston and Wyckoff.[3] These observers, furthermore, pointed out the difficulty of determining just when maximum therapeutic effects have been achieved. Even in their studies of the average doses producing the initial effects of digitalis (a point, it is repeated, that can be more accurately determined than that of the maximum

TABLE 2.—*Control Cases*

Case No.	Body Weight, Pounds	Total Digitalis C.c.*	Relation to Amount Calculated by Eggleston Method Per Cent.	Number of Days to Course of Digitalis
14	160	11.5	71	5
15	142	12	83	5
16	180	17.5	97	12
16†	180	16.5	91	4
17	118	12	101	16
18†	162	20.5	120	41
18	162	15	92	10
19	160	18.2	114	4
20	200	23.1	115	5
21	148	24	162	3
22	110	27	245	5

* After subtraction of 1.5 c.c. daily for the number of days the drug was administered.
† There was an interval exceeding three weeks, during which no digitalis was administered.

therapeutic action), they report in their Table 4 a range of variation as high as 59 per cent. below, and 57 per cent. above, the average doses. With these facts in mind, it is almost surprising to find how closely the total amounts of digitalis given approach those computed by the Eggleston method. It seems justifiable to conclude, therefore, that the tincture of digitalis administered in the cases reported in this paper was effective at a total dosage approximating that indicated by calculations based on the Eggleston method.

POOR ABSORPTION OF DIGITALIS

CASE 23.—*History.*—A man, aged 38, whose condition was diagnosed as hypertensive heart disease and chronic nephritis, was given large amounts of digitalis with no untoward effects. The electrocardiogram on the twenty-fourth day showed: partial heart block, the P-R interval measuring 0.26 second, heart rate, 64, and marked inversion of the T wave, especially in Lead 2.

Digitalis Record.—The weight of the patient was 145 pounds (65 kg.). He was given 25 minims of digitalis three times a day for twenty-four days. The total amount of digitalis given was 118.3 c.c. Subtracting 36 c.c. leaves 83.2 c.c., which is 567 per cent. of the 14.5 c.c. indicated.

Patient 7, although partial heart block and later fibrillation of the auricles appeared, had surprisingly little in the way of symptoms of digitalis toxicity. The total dose in this case, it should be noted, was 755 per cent.. of the amount calculated by the Eggleston method.

In both Case 7 and Case 23, the digitalis therapy was prescribed for the relief of cardiac insufficiency associated with a normal sinus rhythm. In such patients, it is often less easy to observe the therapeutic benefit of digitalis. The striking point, however, in these two cases, Cases 7 and 23, is the enormous amount of the drug that was taken without evidence, at least in Case 23, of serious toxic effects. Since the same preparation of digitalis was administered to these two patients as to the others described in this report, it seems reasonable, as mentioned above, to believe that either their hearts were unusually insusceptible to the action of the drug, or else the latter was poorly

absorbed from their intestinal tracts. Perhaps both of these factors were in operation.

TINCTURE USED

Further information as to the tincture of digitalis used in these cases was sought from the hospital pharmacy. It was learned that the tincture is made in 5 gallon lots about three times a year. In March, 1922, specimens were submitted to the Department of Pharmacology of Harvard Medical School, and to the Antitoxin and Vaccine Laboratory, Massachusetts Department of Public Health. The former, using the one-hour frog method, reported that the preparation was 14 per cent. under the pharmacopeial strength, whereas the latter, by the guinea-pig method of Reed and Vanderkleed, found it was at least 25 per cent. stronger than the standard requirements.

It is realized that the potency of the several lots of digitalis tincture may have varied. However, examination of the dates at which the various cases were treated shows an almost even distribution by months for those in which toxic effects were noted and those I have used as control cases; only one patient in each group was treated in 1921, the remainder being treated between March, 1922, and April, 1923. This fact tends to reduce the number of tinctures used. In my opinion, the data presented under the control cases is sufficient evidence of the potency of the tincture of digitalis administered in the cases reported above.

COMMENT

In the extensive literature pertaining to the action of digitalis, three of the toxic effects reported in this paper, i. e., accelerated sinus rate with partial heart block, the onset of auricular fibrillation, and ventricular ectopic tachycardia, are relatively rare. The first and last of these arrhythmias may simulate the clinical picture of flutter of the auricles, for which digitalis is usually indicated. In case, however, the condition is not auricular flutter but paroxysmal tachycardia rising in the ventricle and resulting from the administration of digitalis, it is the height of folly to give more of the drug, which might increase the chance of the sudden change to ventricular fibrillation, which spells death. I have seen this error made, and in one case I obtained electrocardiograms of the change to fibrillation.

A word about the method of prescribing digitalis: One finds written directions to repeat the dose "every three hours," and in other cases "every four hours." It takes several hours for a dose of digitalis to be absorbed so that its effects may be observed, and Eggleston [18] has clearly pointed out that after the first few doses, the drug should not be administered more frequently than at six-hour intervals, so that sufficient time may elapse to disclose the effect of the preceding dose before another is given. This has greater importance, of course, if relatively large doses are being used. A minimum interval of six hours is one of the safeguards which Eggleston has set for the protection of patients treated by his method and it should not lightly be set aside.

In some instances, the order is written to repeat the dose unless there is vomiting or the pulse rate reaches 60. There is no objection to these directions provided too great reliance is not placed on their protective influence. It must be emphasized that there are some patients who may be seriously or even fatally poisoned by digitalis, and yet emesis does not occur. Also it frequently happens that the onset of ventricular extrasystoles, if the latter are felt at the wrist, may prevent the pulse rate from dropping to 60 a minute.

The calculation of the approximate amount of digitalis required to obtain its therapeutic effects in a patient is now very simple. Many of the patients are affected by serious forms of heart disease, and it seems fair to state that, in the enthusiasm for the brilliant results obtainable by using the large doses of the drug, sufficient respect should be retained for its toxic effects. The physician should be very conscious of the relation of the patient's weight in pounds to the total amount of digitalis estimated to be active in him at any given moment. If any signs or symptoms appear that might be due to toxic effects of digitalis, the relation of the amount of the drug already given to that calculated by the Eggleston method should promptly be determined, and the result used in the decision as to the further administration of the drug.

SUMMARY AND CONCLUSIONS

In thirteen cases in which untoward results followed the administration of digitalis, the records were analyzed to obtain information regarding the appearance of these toxic effects in relation to the total amount of the drug estimated to be then effective in the patients, and to the amount of digitalis indicated according to the Eggleston method of calculating this.

The toxic effects here described are: coupled rhythm, partial heart block with an acceleration of the sinus rate, the onset of auricular fibrillation, and paroxysmal tachycardia originating in the ventricle.

Partial heart block with an increase of the sinus rate, and of ventricular ectopic tachycardia, closely simulates the clinical picture of flutter of the auricles. Continuing the administration of digitalis, especially in cases of the latter arrhythmia, is dangerous.

The tincture of digitalis administered to the patients described in this report was effective at a total dosage approximating that indicated by calculations based on the Eggleston method.

When using a large dosage of digitalis, the physician should know at all times the relation of the amount of the drug already administered to that which would be expected to be the approximate amount for therapeutic effect.

If signs or symptoms appear that may be toxic effects of the drug, and if calculation shows that the amount already given is near or above the Eggleston dosage, additional digitalis should be administered cautiously, if at all.

[18] Eggleston, Cary: Administration of Digitalis by "Eggleston Method," J. A. M. A. 74:733 (March 13) 1920.

East Harlem Health Center Demonstration.—An increase of 81 per cent. in the services of health agencies to 112,000 people, with an increase of but 9 per cent. in cost, is the record announced by the East Harlem Health Center, which is experimenting in the coordination of health work by bringing together for cooperative effort twenty-two health and social agencies. The New York Chapter of the American Red Cross, sponsor for the demonstration, has guaranteed its existence by providing $168,000. Among the outstanding accomplishments of this demonstration are: (1) successful practical coordination, (2) greatly increased efficiency with only slight increase in cost, (3) enlistment of interest of the people, (4) intensive demonstrations, and (5) highly successful follow-up in school health work.—*Public Health Rep.* 38:1581 (July 13) 1923.

THE FAVORABLE PROGNOSIS OF AURICULAR FIBRILLATION *

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Auricular fibrillation in man has generally been considered a result of myocardial damage.[1] Observations in many cases by many observers make it appear that heart function may not be seriously impaired by this rhythm. Whether this abnormal cardiac rhythm, resulting from profound disturbance in the auricles, throws an added burden on the heart's efficiency, or whether it is one of several unimportant signs of impaired cardiac function, is worthy of consideration. Symptoms and signs of decreased cardiac reserve are found in hearts without this rhythm; etiologic and predisposing factors may be the same as are found in auricular fibrillation, and yet the patients present very similar clinical courses. Some hearts develop this rhythm so insidiously that the patient is but little inconvenienced, even though it becomes permanent. Others, after a period of decompensation coincident with the inception of the new rhythm, are tided over and compensate well for years. Still others show brief paroxysms of this arrhythmia, with spontaneous restoration of normal rhythm. Again, it may appear in young hearts in the course of decompensation incidental to acute endocarditis, disappearing with a return of compensation.[2] These facts make it appear that the condition, per se, may not be the cause or the effect of myocardial disease.

INCIDENCE

Auricular fibrillation is the most frequent of all irregularities of the heart.[3] From 60 to 90 per cent. of decompensated hearts, and most irregular hearts with a rate of 120 or over, are probably in this condition.[4] Flint observes that when there is no history of rheumatism, the condition is associated with advancing years, occurring most frequently in the sixth to the seventh decades. It is the usual arrhythmia accompanying decompensation in rheumatic mitral stenosis.[5] It is found more commonly in men than in women (Table 1). If one divides the cases into rheumatic and nonrheumatic groups, the sexes are about equally divided, because mitral stenosis is frequent in rheumatic female subjects, and atheroma in men.

TABLE 1.—*Relation of Fibrillation to Sex, According to Various Authors*

Author	Men, Per Cent.	Women, Per Cent.
Lewis (Cohn, in Nelson's Loose Leaf Medicine **4**: 333, 1920) 189 cases	60	40
Semerau (Cohn, in Nelson's Loose Leaf Medicine **4**: 333, 1920) 193 cases	70.15	29.85
Willius (Clinical Electrocardiography, 1922, p. 66) 500 cases	53.6	46.4
Levine (Am. J. M. Sc. **154**: 43 [July] 1917) 128 cases	50	50

TABLE 2.—*Relation of Various Diseases, According to Various Authors*

Author	Exertion, per Cent.	Articular Rheumatism, per Cent.	Syphilis, per Cent.	Infective Disease per Cent.	Atherosclerosis, per Cent.	Renal Disease, per Cent.	Exophthalmic Goiter, per Cent.	Adenoma Thyroid, per Cent.
Lewis (after Cohn) 152 cases	....	66.3	0.7	0.7	17.7	8.5	....	....
Frey (after Cohn) 100 cases	....	31.0	....	4.0	32.0	9.0	5.0	....
Semerau (after Cohn)	6.3	26.1	6.3	3.6	36.1	4.5	0.9	....
Willius* 500 cases	....	30.6	....	....	69.4	....	27.9	20.5

* He estimates (Clinical Electrocardiography, p. 66) that 9 per cent. of exophthalmic goiter and 70 per cent. of toxic thyroid adenomas show auricular fibrillation.

ETIOLOGIC AND PREDISPOSING FACTORS

Besides rheumatism with valvular endocarditis and arteriosclerosis, both of which are apt to be accompanied by myocardial weakness, various other factors are of prognostic significance. Among these are pro-

* Read before the Section on Practice of Medicine at the Seventy-Fourth Annual Session of the American Medical Association, San Francisco, June, 1923.

* Because of lack of space, this article is abbreviated in THE JOURNAL. The complete article appears in the Transactions of the Section and in the author's reprints. A copy of the latter will be sent by the author on receipt of a stamped addressed envelop.

1. Years ago, physiologists noted that there was fibrillation of the ventricles just before death in experimental animals, and that fibrillation of the auricles was less apt to be fatal, since the auricles recover normal rhythm more easily than the ventricles. "The auricles, when in a state of fibrillation, present an entirely different aspect than during normal action; the walls of the auricle stand in diastolic position; systole, either complete or partial, is never accomplished; the wall, as a whole, is stationary, but careful examination of the muscle reveals an extremely active condition; it appears to be alive with movement; rapid, minute and constant twitching or undulatory movements are observed in a multitude of small areas upon its surface" (James Mackenzie: Diseases of the Heart, 1914, p. 216). "The movement as a whole is more or less incoordinate, and therefore ineffectual" (Thomas Lewis: Mechanism and Graphic Registration of the Heart Beat, 1920, p. 444). The story of the discovery that this form of arrhythmia is due to fibrillation of the auricle is nothing short of dramatic. Lewis' explanation of a circuituous pathway of the contraction impulse in the auricular wall, and the more recent use of quinidin, have reawakened interest in the subject. While there are now numerous references to the use of quinidin in auricular fibrillation, the following are among the first to appear: Levy, R. L.: Restoration of the Normal Cardiac Mechanism in Auricular Fibrillation by Quinidin, J. A. M. A. **76**: 1289 (May 7) 1921. Lewis, Drury, Iliescu and Wedd: Restoration of Normal Cardiac Mechanism in Auricular Fibrillation, Brit. M. J. **2**: 514 (Oct.) 1921. White, P. D.; Marvin, H. M., and Burwell, C. S.: The Action of Quinidine Sulphate in Heart Disease to Abolish the Circus Movement of Auricular Flutter and Fibrillation, M. Rec. **185**: 647 (Dec. 1) 1921. Lewis, Thomas: The Value of Quinidine Sulphate in Cases of Auricular Fibrillation, Am. J. M. Sc. **163**: 781 (June) 1922; The Action of Atropine and Quinidine in Fibrillation of the Auricles, ibid. **164**: 1 (July) 1922. "Arrhythmia perpetua" had been noted years before, and Nothnagel described a case in 1878, which we now recognize as auricular fibrillation, as noted by Hamburger (The Recognition and Treatment of Different Forms of Auricular Fibrillation, M. Clin. N. Am. **5**: 1705 [May] 1922). The condition was recognized as an entity by Mackenzie as early as 1890, but he thought it due to irregular simultaneous contractions of auricles and ventricles from a stimulus arising in the auriculoventricular node, and so termed it "nodal rhythm." He noted the disappearance of the auricular wave in jugular tracings. Cushny, in 1906, noted the similarity between tracings from dogs with auricular fibrillation and human tracings of paroxysmal irregularities, and suggested that this might be a factor of clinical importance; on a visit to Mackenzie, he suggested that auricular fibrillation might be identical with "nodal rhythm." Mackenzie published polygraph tracings with this explanation in 1907, but stated that he "failed to appreciate what auricular fibrillation really was." Lewis had been investigating cardiac irregularities clinically, and experimentally producing fibrillation of the auricles in the dog, and noted in 1909 that with the onset of fibrillation the venous curves changed from the auricular to the ventricular form, and the electrocardiograms, especially in Lead III, showed certain oscillations during ventricular diastole, produced by the fibrillating auricles. Examining some of the electrocardiograms of typical cases of "nodal rhythm" sent him by Mackenzie, he found these oscillations present and demonstrated their correspondence with the small fibrillation waves. Rothberger and Winterberg also showed the electrocardiographic relation between fibrillation in man and animals in the same year.

2. An illustration of the insidious development of auricular fibrillation, with no subjective or objective symptoms or signs, is seen in Case 1. Fibrillation developing during an acute cardiac breakdown incidental to chronic endocarditis is seen in Case 27, while fibrillation found a year after an acute breakdown is seen in Case 26. Case 17 is probably of fifteen years' duration, and yet the patient, now 69 years old, is comfortable and ambulatory. Cases 15 and 35 illustrate paroxysmal auricular fibrillation, with restoration of normal rhythm between attacks; in the first, a comparatively young man, there are but few signs of disturbed cardiac function, while in the second, a man of 69, pulmonary edema of alarming severity has attended the attacks. Mackenzie (Diseases of the Heart, pp. 217 and 229) refers to a patient, a physician, aged 50, seen in a transient attack. He was under observation for ten years, remaining well and with a regular heart. Bishop (J. A. M. A. **79**: 196 [July] 1922) refers to patients under observation fifteen years in comparative comfort with permanent fibrillation.

3. According to various authors, the arrhythmias are found in the following frequency: auricular fibrillation, 48 per cent.; premature contractions, 44 per cent.; sinus irregularities, 14.4 per cent.; disorders of conduction, 4.15 per cent.; flutter of auricles, 1.1 per cent. According to Lewis, the last three types of arrhythmia form about 25 per cent. of all.

4. Flint, H. L.: The Heart: Old and New Views, New York, Paul B. Hoeber, 1921, p. 148. Mackenzie, James: Diseases of the Heart, p. 217.

5. Neuhof, S.: Clinical Cardiology, New York, the Macmillan Company, 1917, p. 104.

longed effort, infective diseases, thyroid disease and renal disease [6] (Table 2). Effort, sometimes slight and sometimes violent, may produce it. This occurs most often in middle life or in rheumatic hearts.[7]

Digitalis may produce it,[8] while, on the other hand, Eyster and Fahr [9] refer to rare cases in which auricular fibrillation is not accompanied by demonstrable valvular or myocardial change, and in which no serious break in compensation has occurred.

Contrary to the view of muscle damage as the cause of fibrillation, it is thought by some to be due to abnormal stimulus production in the sinus node, or multiple foci in the auricular wall, or that the disorganization of auricular activity is a defect in conduction, the sinus node maintaining its activity or some other auricular focus taking it over.[10]

PROGNOSTIC FACTORS

In spite of its frequency, its etiologic relation to antecedent rheumatic involvement with endocarditis or to cardiosclerosis, and the ease of recognition of auricular fibrillation,[11] it is too frequently overlooked, or when it is suspected or recognized, a serious prognosis is too often given. While there are numerous contributions to the subject in the literature, they have dealt largely with diagnosis, discussion of its mechanism, or response to quinidin, and not with prognosis. Pardee,[12] however, pointed out that an irregular heart does not of necessity cripple the individual, and that breaking down of cardiac reserve takes a variable amount of time, the variation depending on the quality of heart muscle, on the demands the patient makes on his heart, or on the associated pathologic conditions.

Whether auricular fibrillation depends on diseased myocardium or to changes in stimulus production or conduction, prognosis depends primarily on the degree and duration of impaired cardiac efficiency and the heart's ability to function under the new rate and rhythm. If decompensation is severe, moderate or mild, the future of the patient will depend also on his age, etiologic and predisposing factors, associated pathologic conditions and response to treatment. The outlook in a patient of 30, with antecedent attacks of acute arthritis and endocardial damage, is obviously quite different from that in a patient of 60, with thickened peripheral arteries, an enlarged heart and a story of gradually failing circulation, incidental to long continued arterial tension; in the former, the young myocardium has remarkable powers of recuperation, while in the latter, evidences of myocardial weakness may be obvious. On the other hand, irrespective of age or predisposing factors, auricular fibrillation may be attended by profound circulatory failure, the heart responding promptly to treatment, even a return to normal rhythm; or, in spite of treatment, there is a fatal termination.

Consideration of factors leading to serious decompensation and death is of prognostic value. A downward course, in spite of treatment, is evidence of failing heart muscle whose reserve is exhausted. It will be noted in the cases here cited that duration of fibrillation is not necessarily a factor. Recurrent decompensation was found in more than half the cases. Rheumatic history and chronic valvular lesions, or atheroma are definite factors. The duration of decompensation before death illustrates the progress of cardiac failure (Tables 3 and 4).

Electrocardiographic records in auricular fibrillation have been emphasized by White,[13] who found that aberrant ventricular complexes or ectopic ventricular contractions have a prognosis twice as grave as uncomplicated auricular fibrillation because these indicate serious myocardial damage or irritability of the ventricle, which does not stand up under the strain as relatively healthy muscle does. Willius, in 500 cases, found 133 patients with premature beats, aberrant Q-R-S in all derivations, or aberrant Q-R-S with premature ventricular beats (Table 5). In the latter, the mortality was 87.5 per cent. He concludes that mortality attending fibrillation doubles and in some groups trebles that occurring in similar types of heart disease not complicated by this arrhythmia, but that it is not the arrhythmia per se which is the determining factor, but the integrity of the myocardium and proper treatment.

Clinical Groups.—As pointed out by others, auricular fibrillation cases fall into certain clinical groups, the most definite being those with and without rheumatic endocarditis. In the latter, syphilis is a relatively unimportant factor.[14] There are two distinct clinical groups as to etiology. The relation of these groups to present condition and to sex is shown in Table 6.

The onset of the irregular rhythm was insidious or gradual in twenty-nine cases, dated by the patient to effort in eight, to influenza in six, and seemed to be a

6. S. A. Levine (Am. J. M. Sc. **154**: 146, 1917) found, in eighteen cases of transient auricular fibrillation, one during lysis of pneumonia similar to one described by Krumbhaar (Transient Auricular Fibrillation, an Electrocardiographic Study, Arch. Int. Med. **18**: 263 [Aug.] 1916); one in hyperthyroidism; one after operation; two during acute rheumatic fever; four following auricular fibrillation; four as a result of active digitalis therapy, and six spontaneous or idiopathic. He also refers to Cohn as finding transient auricular fibrillation in twelve of 123 cases of pneumonia, and two cases in healthy, athletic young men.

7. This is well seen in Cases 10, 3, 4, 29 and 34 of this series.

8. White and Burwell (The Clinical Significance of Changes in the Form of the Electrocardiogram, M. Clin. N. Am. **4**: 1843 [May] 1921) cite a case of auricular fibrillation (paroxysmal) assumed to be due to digitalis. The patient was admitted with normal rhythm but with cardiosclerosis and moderate decompensation, and precordial pain on exertion from cardiac symptoms, and he then had auricular fibrillation. Digitalis was stopped, and a week later he had normal rhythm. He was under observation for six years. Three years after the time he was first seen, fibrillation was present and permanent. The steady, slow, downward course in an old man with marked arteriosclerosis and final permanent fibrillation was not accompanied by any period of acute heart failure, the patient being able to work constantly on his farm. Progressive changes in the electrocardiogram were characteristic of advancing myocardial involvement.

9. Eyster, J. A. E., and Fahr, C. E.: Observations on the Use of Quinidin in Auricular Fibrillation, Arch. Int. Med. **29**: 59 (Jan. 16) 1922. "While acutely developing auricular fibrillation undoubtedly causes considerable mechanical deficiency of the heart and is probably not infrequently the cause of cardiac decompensation, the heart may compensate for this as it does for valve injury, particularly when it is assisted by the protective influence of ventricular stimulation by digitalization."

10. Cohn thus summarizes a discussion of the subject: "On account of the view generally held of the function of heart muscle and because of the transient nature of the irregularity in many instances, there seems to be little reason for laying undue stress on structural alteration of the muscle to account for this abnormal rhythm" (Nelson's Loose Leaf Medicine **4**: 335).

11. Auricular fibrillation is detected without instruments by: 1. The fact that it is the usual type of arrhythmia, especially in the conditions cited. 2. The complete arrhythmia, no two successive beats being the same in rhythm or force. This is contrary to the next frequent arrhythmia, due to premature contractions, in that in the latter there are runs of normal rhythm followed by what appears to be a dropped beat at the radial pulse, but which in reality is a beat appearing earlier than normal and followed by a compensatory pause. The premature beat is usually too weak to come through to the wrist, but can be heard over the heart with the stethoscope. 3. The deficit between the radial count and that over the heart as heard with the stethoscope. This is due to many weak ventricular contractions which do not come through to the radial artery. This may also be present in frequent ectopic beats when some are too weak to appear at the radial artery. 4. The history of impaired cardiac efficiency, as shown by the presence of antecedent endocarditis and valvular lesions, especially of the mitral valve. 5. History of long continued heart strain from arterial hypertension and accompanying cardiosclerosis.

12. Pardee, H. E. B.: The Prognosis of Auricular Fibrillation, J. A. M. A. **64**: 2057 (June 19) 1915.

13. P. D. White (Prognosis in Heart Disease in Relation to Auricular Fibrillation and Alternation of the Pulse, Am. J. M. Sc. **157**: 5 [Jan.] 1919) showed that in pulsus alternans the prognosis is much more grave than in auricular fibrillation, but that fibrillation as such adds little, if anything, to the gravity of prognosis in a case of heart disease. Forty-eight per cent. of 100 patients with fibrillation and 47 per cent. of 100 patients with similar hearts, but without fibrillation, died.

14. Levine, S. A.: Auricular Fibrillation: Some Clinical Considerations, Am. J. M. Sc. **154**: 43 (July) 1917. In 128 cases, Levine found only eleven that showed syphilis, while 12 per cent. of all cases admitted to the medical wards showed syphilis.

result of atheroma associated with hypertension in twenty-three. It was associated with chronic valvular lesions in twenty-three, and both endocarditis and atheroma were found in fourteen.

The duration of auricular fibrillation is often difficult to determine accurately, but in many cases the patient is aware of the irregularity (Table 8). The degree and recurrence of decompensation from the history and from observation give some idea of the severity of myocardial weakness (Table 9).

Response to treatment, with consideration of the frequency, severity and duration of attacks of decompensation, gives a measure of prognosis. Many patients with a heart rate over 120 make quick recovery on digitalis and may be able to undertake rather heavy physical work so long as the rate is kept down by digitalis.

Brachmann [15] emphasizes cardiac and mental rest.

Hamburger [16] states that it is not so much the heart rate observed at first as the heart rate observed after treatment that is important. Cohn [17] emphasizes the prognostic value of the pulse deficit, the disparity between the heart rate and the pulse rate decreasing as the patient improves and as the heart slows. Christian,[18] comparing digitalis effect in chronic cardiac cases

Table 3.—Summary of Cases

	Case	Sex *	Age	Duration	Period of Observation	Onset: Gradual	Onset: Insidious	Onset: Effort	Onset: Postinfluenzal	Decompensation: Severe	Decompensation: Mild	Decompensation: Recurrent	Decompensation: At Present	Improved with Treatment	Downward Course	Rheumatic History	Valve Lesions: Mitral Insufficiency	Valve Lesions: Mitral Stenosis	Valve Lesions: Aortic	Valve Lesions: Atherosclerosis	Symptoms and Signs During Decompensation: Dyspnea	Gastro-Intestinal	Palpitation	Pain	Cough	Dizziness	Edema	Heart Borders	Enlarged Liver	Pulmonary Edema	Present Condition: Good	Fair	Poor	Dead	
Nonrheumatic Group	1	♂	50	?	3 yr.	+	+	—	—	—	±	—	0	+	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	+	—	—	—	
	2	♀	62	1 yr.	1 yr.	..	..	+	..	±	—	—	0	++	—	—	—	—	—	—	+	—	+	—	—	±	—	+	—	+	—	—	—	
	3	♂	34	2½ yr.	2½ yr.	—	—	++	?	3 m.	—	—	0	++	—	—	—	—	—	—	+	+	+	—	+	—	+	..	..	—	+	—	—	
	4	♂	40	1 yr.	1 yr.	—	—	+	—	±	—	—	++	+	—	—	—	—	—	—	—	—	—	—	—	—	—	½″	—	—	..	+	..	..	
	5	♀	70	1½ yr.	1 da.	+	+	—	—	++	—	+	D	±	+	—	—	—	—	+	+	+	+	—	—	..	+	Mid. ax.	4 fb.	—	—	—	—	+	
	6	♂	74	4 mo.	3 wk.	+	—	—	—	++	—	—	D	±	+	—	—	—	—	+	+	+	+	—	—	—	+	Mid. ax.	4 fb.	—	—	—	—	+	
	7	♂	63	1 yr.	Short	+	—	—	+	—	+	—	+	+	—	—	—	—	—	+	+	—	—	—	—	—	—	⅛″	—	—	+	—	—	—	
	8	♂	56	3 mo.	Short	+	—	—	++	—	+	—	—	+	+	—	—	—	—	?	+	—	—	—	—	—	—	½″	?	—	—	+	—	—	
	9	♀	70	3 mo.	Short	+	—	—	+	+	—	+	..	+	+	—	—	—	—	—	+	Gas	+	+	—	—	—	++	1″	2 fb.	—	—	+	—	—	
	10	♂	56	6 yr.	6 yr.	—	—	+	+	—	—	—	—	+	—	—	—	—	—	+	+	—	—	—	+	—	..	+	..	—	+	—	—	—	
	11	♂	60	2 mo.	3 yr.	+	—	—	—	—	+	—	—	+	—	—	—	—	—	+	—	—	—	—	—	..	..	1″	+	—	+	—	—	—	
	12	♂	66	4 yr.	Short	+	—	—	+	+	—	—	±	±	+	—	—	—	+	++	++	+	—	—	+	—	—	Mid. ax.	—	—	—	+	—	—	
	13	♂	72	1 yr.	Short	+	—	—	—	—	+	—	+	+	+	—	—	—	—	+	+	—	+	—	+	—	—	Ant. ax.	—	—	—	+	—	—	Prostatic operation
	14	♂	47	+ 3 mo.	Short	+	—	—	—	—	+	—	0	+	—	—	—	—	—	+	++	..	..	..	+	..	..	2″	—	+	+	—	—	—	
Rheumatic Group	15	♂	44	Short	2 yr.	+	—	—	—	—	+	..	—	+	—	—	?	?	—	±	At-tack	+	+	—	—	—	—	1″	—	—	+	—	—	—	Paroxysmal auricular fibrillation
	16	♂	72	Yrs.	3 yr.	+	—	—	—	+	—	+	0	+	—	25 y. ++	+	+	+	++	+	+	+	—	—	—	—	Ant. ax.	4 fb	—	+	—	—	—	
	17	♀	69	15 yr.	8 yr.	+	—	—	—	+	—	+	±	+	—	+	+	—	—	±	+	+	+	—	—	—	—	2″	1 fb.	—	+	—	—	—	
	18	♀	65	8 yr.	Short	+	—	—	—	+	—	+	D	—	—	+	+	+	+	+	+	+	+	—	—	—	+	Ant. ax.	3 fb.	—	—	—	—	+	
	19	♀	62	Yrs.	8 yr.	+	—	+	—	+	—	+	—	+	+	+	+	—	—	+	+	+	+	—	+	+	+	Ant. ax.	3 fb.	—	—	—	—	?	
	20	♀	46	3 yr.	—	+	—	—	++	+	—	+	D	+	+	7 y.	+	—	+	+	+	+	+	—	—	—	+	Ant. ax.	+ 3 fb.	—	—	—	—	+	
	21	♀	38	3 yr.	10 da.	+	—	—	—	+	—	—	D	+	+	+	+	—	—	—	++	+	+	..	..	..	..	Ant. ax.	+	—	—	—	—	+	
	22	♀	36	3 mo.	Short	+	—	—	—	++	—	+	D	—	+	+	++	—	—	—	++	+	+	+	—	+	—	Mid. ax.	4 fb.	—	—	—	—	+	
	23	♂	73	6 mo.	1 yr.	+	—	—	—	+	—	+	D	+	+	+	+	—	+	++	++	+	+	—	—	+	+	Ant. ax.	3 fb.	—	—	—	—	+	
	24	♀	49	4 yr.	3 mo.	+	+	—	—	+	—	+	D	+	+	+	+	..	+	—	+	+	—	—	—	—	—	Ant. ax.	3 fb.	—	—	—	—	+	Cancer uterus
	25	♂	21	3 mo.	1 mo.	+	—	—	—	++	—	+	—	+	—	+	+	+	—	—	+	—	—	—	—	..	1″	—	—	—	+	—	—	
	26	♀	60	Less than 1 yr.	1 yr.	+	—	—	—	++	—	+	—	++	..	++	+	—	—	+	+	+	—	+	—	—	—	Ant. ax.	2 fb.	—	+	—	—	—	
	27	♀	57	+ 3 yr.	3 yr.	+	—	—	—	+	—	+	—	++	—	+	+	+	—	—	+	+	+	—	—	—	—	½″	1 fb.	—	+	—	—	—	
	28	♀	66	+ 2 yr.	5 mo.	+	—	—	—	+	—	—	D	±	+	+	+	+	..	+	+	+	..	+	+	..	+	Ant. ax.	3 fb.	—	—	—	—	+	
	29	♂	49	7 yr.	6 yr.	—	—	+	—	+	—	+	—	++	..	+	+	+	—	+	+	+	—	—	—	—	—	Ant. ax.	3 fb.	—	±	—	—	—	
	30	♀	40	Yrs.	1 yr.	+	—	—	—	—	+	—	±	+	—	+	+	+	—	—	±	+	—	—	—	—	+	1″	1 fb.	—	+	—	—	—	
	31	♂	45	2 yr.?	8 mo.	+	—	—	—	—	+	—	+	+	—	+	+	—	—	+	+	—	+	++	—	—	—	2″	—	—	—	+	—	—	
	32	♂	50	Yrs.?	9 mo.	+	—	+	—	—	+	+	±	++	—	+	—	+	—	+	++	—	+	+	—	—	—	1″	1 fb.	—	+	—	—	—	
	33	♂	50	?	3 mo.	+	—	—	—	—	+	—	+	±	+	Tons	+	—	+	±	+	+	+	+	—	—	..	3″	—	—	+	—	—	—	
	34	♀	36	Short	—	—	—	—	—	±	—	+	—	+	—	+	+	—	—	—	+	+	+	..	+	..	+	Mid. ax.	4 fb.	—	+	—	—	—	Pregnancy, hypertension, albuminuria
	35	♂	69	Short	8 mo.	—	—	+	—	+	—	+	±	++	—	+	+	—	+	+	+	+	++	+	—	+	++	2″	2 fb.	++	+	—	—	—	Paroxysmal auricular fibrillation
	36	♀	45	Yrs.	Short	—	—	—	—	+	—	+	±	++	—	+	—	+	—	—	+	—	+	+	..	..	+	1½″	1	+	+	—	—	—	
	37	♂	35	3 yr.	Short	+	—	—	—	+	+	+	±	+	—	—	+	—	—	—	+	+	+	—	—	—	±	±	—	—	+	—	—	—	

* In this column, ♂ indicates male, and ♀ female.

15. Brachmann, D. S.: Auricular Fibrillation, from Observations and Deductions from a Series of Four Hundred Cases, Lancet **1**: 374 (Feb. 19) 1921. The effect of digitalis is explained by exhaustion "brought about by the ventricular rate being stimulated to too great activity, and the slowing enables the ventricle to get more rest and so regain a measure of strength. From this result the condition of the muscle is determined, and one can estimate, within certain limits, the amount of healthy muscle by the degree of recovery."

16. Hamburger, W. W.: Treatment of Auricular Fibrillation, M. Clin. N. Am. **5**: 1716 (May) 1922.

17. Cohn, A. H., in Nelson's Loose Leaf Medicine **4**: 333.

18. Christian, H. A.: Digitalis Effect in Chronic Cardiac Cases with Regular Rhythm in Contrast to Auricular Fibrillation, M. Clin. N. Am. **5**: 1173 (March) 1922.

with and without fibrillation, found that when he got good results from digitalis the heart slowed, irrespective of rhythm.[19]

Valvular lesions were demonstrated clinically in all of Group 2, usually evidenced by a mitral systolic murmur. The cases have been so grouped with a full realization that such a murmur may appear in cardiosclerosis

TABLE 4.—*Fatal Cases*

Case	Duration of Auricular Fibrillation	Recurrent Decompensation	Chronic Endocarditis	Atheroma	Duration of Decompensation Before Death	Age, Years
5	1½ yrs.	+	—	+	6 mos.	70
6	4 mos.	—	—	+	4 mos.	74
18	8 yrs.	+	+	+	2 mos.	65
20	3 yrs.	+	+	+	6 mos.	46
21	3 yrs.	—	+	—	3½ yrs.	38
22	3 mos.	+	+	—	6 mos.	36
23	6 mos.	+	+	+	6 mos.	73
24	4 yrs.	—	+	—	5 wks.	49
28	2 yrs.	—	+	+	1½ yrs.	66

TABLE 5.—*Findings of Willius*

	Cases	Aur. Fib. Mortality, per Cent.	Control Mortality, per Cent.
Complete series	500	41.3	13.6
Uncomplicated	367	36.9	16.2
With premature ventricular beats	80	42.0	15.9
Aberrant Q R S in all derivations	33	63.4	54.2
Aberrant Q R S and premature ventricular beats	11	87.5	87.5
In mitral regurgitation	72	51.9	27.8
In mitral stenosis	27	47.1	22.2
In mitral regurgitation and stenosis	40	53.4	34.6
In aortic regurgitation	13	33.7	71.4
In chronic myocarditis	81	43.3	43.3
In myocarditis secondary to hypertension	98	54.7	53.8
In myocarditis secondary to exophthalmic goiter	97	34.2	17.1
In myocarditis secondary to adenoma thyroidism and hyperthyroidism	71	30.0	8.9

or in a dilated and weakened heart. The history of acute rheumatism, sometimes recurrent, the recollection on the part of the patient that there were accompanying valvular lesions, and evidence of such a lesion at the time of observation have all been taken into account. The mitral stenotic murmur was found in ten cases. This has given rise to much discussion, since its presence has been taken as evidence of auricular contraction.[20]

The measure of cardiac efficiency has the same significance in auricular fibrillation as in other cardiac conditions. No one sign determines prognosis, but the composite of many symptoms and signs which indicate weakened heart muscle. In 100 patients without fibrillation, the early symptoms and signs were: dyspnea, 92; palpitation and consciousness of arrhythmia, 66; pain, 50; dizziness, 40; cough, 31; gastro-intestinal, 19; pulmonary edema, 10; heart enlargement, 74; albuminuria, 38; edema, 17; liver enlargement, 9, and disturbance in rhythm, 36.

It will be noted in Table 3 how frequently the heart and liver borders were increased in mild decompensation. This seems to indicate that the heart adjusts itself to the combined factors which increase the demands on it by hypertrophy, and that the liver, at an earlier stage often much enlarged from passive congestion, remains so, though function is not much embarrassed.

GROUP 1.—CASES WITHOUT RHEUMATIC HISTORY OR ENDOCARDITIS; ONSET GRADUAL, INSIDIOUS, FOLLOWING INFLUENZA OR EFFORT

CASE 1.—Mr. R. H. B., aged 50, seen, May 21, 1920, because that morning during examination for life insurance, the heart was found irregular, had no symptoms and did not know how long the heart had been irregular; he had never been aware of it.

Polygrams at this time showed auricular fibrillation.

In this patient, irregularity of the heart came on without his being aware of any cardiac distress or signs of cardiac

TABLE 6.—*Relation of Clinical Groups to Present Condition and to Sex*

	Condition Good	Condition Fair	Died	Males	Females
No endocarditis or rheumatic history	6	6	2	11	3
Endocarditis and rheumatic history	13	2	7	10	13

TABLE 7.—*Relation of Onset to Etiologic Factors*

Effort	Gradual or Insidious	Postinfluenzal	With Atheroma and Hypertension	With Endocarditis	Endocarditis and Atheroma
8	29	6	9	23	13

TABLE 8.—*Duration*

	Number
15 years	1
8 years	1
7 years	1
6 years	1
4 years	2
3 years	2
2 years	2
"Years"	7
Less than 1 year	13
Paroxysmal	2

TABLE 9.—*Degree and Recurrence of Decompensation*

Former Attacks	Number of Cases	Present Condition		
		Good	Fair	Dead
Severe	24	9	5	10
Moderate	11	8	3	..
Recurrent	19	8	2	7

strain. It has continued now for three years and the heart is functionally normal. Digitalis did not restore normal rhythm.

CASE 2.—Mrs. R. G. R., aged 62, seen in 1919, had no cardiac symptoms, and heart examination was completely normal at that time, with a blood pressure of 130 systolic and 80 diastolic. She was not seen again until July 7, 1922, when she complained of considerable dyspnea and, the night before, considerable orthopnea. She dated her trouble to May, two months before,

19. Quinidin was not used in this series because the patients were not under hospital and electrocardiographic control.

20. According to Flint (The Heart: Old and New Views, p. 148), two factors are involved in the variability of murmurs in this condition: The auricle does not contract as a chamber but remains in the position of diastole; the murmurs which occur during the diastolic period in mitral stenosis are dependent on the rate of flow of blood from auricle and ventricle. With auricular contraction, the intra-auricular pressure is greatest during the active contraction of this chamber and again at the opening of the mitral avalve. The two varieties of diastolic murmurs in mitral stenosis are due to these two causes. The position of the murmurs caused by the contraction of the auricle depends on the time relation of this contraction to the diastole of the ventricle. This murmur, which is crescendo in character and called auriculosystolic, disappears in fibrillation, whereas the other diastolic murmur remains unaffected by fibrillation and bears a fixed relation to the second sound of the heart. The amount of diastolic period which the latter murmur occupies will depend on the rate of the heart and the degrees of stenosis. Cohn (p. 335) discusses it as follows: "This disappears necessarily at onset of fibrillation. It is made when the mechanism of the heart is normal by the contraction of the left auricle; when the auricles fibrillate, the possibility of creating the murmur by their contraction no longer exists. The auricular-ventricular murmur accordingly ceases, but in the normally beating heart blood flows from the left auricle to the left ventricle during the whole of the ventricular diastolic period, not merely at the terminal portion of it during the contraction of the auricle. The flow of blood into the ventricle which takes place in the first portion of ventricular diastole likewise produces a murmur, often of rumbling character, in passing the stenotic valve. This murmur is present irrespective of the nature of auricular activity, whether coordinate or fibrillating."

when she was very busy with house cleaning and noted that her heart was irregular. Electrocardiograms showed auricular fibrillation. There was some notching of the R. She improved rapidly on digitalis, and is now quite well.

Case 3.—Mr. F. A. H., aged 34, seen, Sept. 29, 1921, had been troubled with his heart since January, 1921, coming on after extreme exertion, the symptoms then being dyspnea and weakness. He was in the hospital for three months. He had more or less broken compensation, but, on the whole, he was quite comfortable. The heart was completely irregular, and electrocardiograms showed typical auricular fibrillation. This patient has gone on since in comfort, occasionally requiring digitalis to tide him over periods of broken compensation.

Case 4.—Mr. W. A. W., aged 40, seen, Aug. 15, 1922, a stationary engineer, had not been able to work since February. The valve sounds were clear. Electrocardiograms showed typical auricular fibrillation. The heart has improved but is still irregular.

Case 5.—Mrs. T. H. M., aged 70, seen, June 20, 1919, for cystitis, had an irregular heart, which irregularity came on insidiously. Polygrams showed auricular fibrillation. She was not seen again until Sept. 26, 1920; she had not been well since March. The heart was dilated to the midaxillary line. The sounds were clear. The pulse was 130; the heart, 160. The systolic blood pressure was 190; diastolic, 105. Polygrams showed auricular fibrillation. The patient died suddenly the day following.

Case 6.—Mr. C. W. D., aged 74, seen, Oct. 20, 1920, complained of heart trouble for four months, weakness, dyspnea, nausea and edema. He was cyanotic, the liver was tender, palpated four finger breadths below the costal margin, and the heart was dilated to the midaxillary line, and very irregular. The heart rate was 150; radial pulse, 100. The systolic blood pressure was 195; diastolic, 100. The heart sounds were clear. Polygrams showed auricular fibrillation. The patient died ten days later.

Case 7.—Mr. O. A. D., aged 60, seen, Dec. 20, 1919, had been troubled with the heart since having influenza in November, 1918. There had been no symptoms for four or five months after the influenza, but gradually increasing weakness and dyspnea on exertion. The condition had been getting worse for the past two months. He had had no former illness. The condition was recognized as auricular fibrillation from the polygrams; digitalis was given, with steady improvement. December 24, the heart rate was 56; the pulse, 44. In February, on returning from California, the patient was comfortable. The heart was still irregular.

Case 8.—Mr. W. A. A., aged 56, seen, May 10, 1922, complained of dyspnea on exertion, and soreness of the calves of the legs; he was subject to frequent colds; his heart, which he knew was irregular, was worse with cough. He dated his trouble from influenza in February, 1922. When seen two months later, he was better, but still had dyspnea on unusual effort and his heart still showed fibrillation.

Case 9.—Mrs. E. M. T., aged 70, seen, May 31, 1922, complained of "asthma" for two years, but since an attack of influenza three months before, when she was in bed for three weeks, she had swelling of the ankles and feet, gas in the abdomen, palpitation, throbbing of the vessels in the neck, and orthopnea. An electrocardiogram showed typical fibrillation with ectopic beats. The patient has not been seen since, but reports that she has not improved much. One cannot say how long the fibrillation has been present.

Case 10.—Mr. H. L. S., aged 56, seen, Aug. 31, 1921, knew that his heart had been irregular for the past four years. The onset occurred with sudden fright and exertion; his house caught fire, he had considerable trouble in awakening his wife, and then he ran to a fire alarm box. His physician gave him digitalis because he was quite dyspneic and there were apparently evidences of heart failure. Nine months ago he had influenza with bronchitis and possible pneumonia; the heart was then enlarged and it was irregular. It improved with digitalis.

In this man of 56, the onset seems to date definitely to the time of fright and severe exertion, when he had an acute heart breakdown of moderate severity which responded to digitalis. The heart was probably irregular at that time and has been so since. At present, nearly five years after the onset, the man is efficient and able to attend to his business with no marked evidences of heart strain.

Case 11.—Mr. J. H. H., aged 60, seen, Aug. 30, 1921, two months before began to tire easily, and lost 20 pounds (9 kg.) in two months. Electrocardiograms showed definite auricular fibrillation with ectopic beats. September 6, he was better and the heart was regular, but, on the 7th, auricular fibrillation was again present. Digitalis was continued for the next two months, the patient feeling very much better, although his heart remained irregular. Electrocardiograms still showed auricular fibrillation. He has been at work since.

Case 12.—Mr. C. J. A., aged 66, seen, Aug. 29, 1922, complained of marked dyspnea, digestive disturbances, cough and moderate sputum in the morning, and rather frequent hiccup. He dated his trouble from moderately severe influenza in 1918 and again in 1921. Since then there had been increasing difficulty with breathing, and other evidences of gradual circulatory breakdown.

In this man of 66, a farmer who had done heavy physical work, the onset of the circulatory failure seems to date to mild attacks of influenza, the first one being four years ago. In spite of the marked dilatation of his heart and the complete arrhythmia, he did not have orthopnea, and his cardiac failure was only moderate. The arteries were extremely tortuous and thickened. In spite of these factors, this man has probably gone on for two or three years with a completely irregular heart. His physician at home told him that his heart was irregular during the influenza. The patient was under observation for four weeks. There was marked improvement in the heart; he was symptomatically relieved, but, since returning home, to a higher altitude, he has not been so well, and the outlook is not favorable.

Case 13.—Mr. W., aged 72, seen, Sept. 18, 1922, had moderate circulatory failure. He improved under digitalis, although the heart never became regular and the bladder and prostatic trouble still persisted. On account of the man's age and infection the prognosis is, of course, unfavorable, irrespective of the cardiac condition.

Case 14.—Mr. F. G., aged 47, a laborer, seen, Oct. 18, 1922, had been in the hospital in July on account of an accident. He had what he called asthma in April. Since July he had had cough, a little sputum, and shortness of breath on the slightest effort. He did not know that he had any irregularity of the pulse. He was very well nourished, with no cyanosis and only slight respiratory effort. Electrocardiograms showed typical auricular fibrillation. The systolic blood pressure was 180; diastolic, 100. He was given digitalis, to which he responded readily, so that now he is quite comfortable.

GROUP 2.—WITH RHEUMATIC HISTORY AND CHRONIC ENDOCARDITIS

Case 15.—Mr. J. A. E., aged 44, seen, Dec. 15, 1920, complained of palpitation and irregularity of the heart for about three months. He was not seen again until Oct. 20, 1922, when he said he had had six attacks with his heart since he had been seen before, characterized by extreme palpitation, usually of sudden onset, lasting from a few hours to two or three days, without apparent cause. The left heart border was 1 inch outside the normal limits; the pulse rate was 190. Electrocardiograms showed paroxysmal auricular fibrillation.

In this man of 44 with cardiac history, dating back to the age of 12, cardiac symptoms have not been prominent until the last two or three years, characterized by paroxysmal tachycardia due to auricular fibrillation, which disappears between attacks, when cardiac efficiency is good. He is able to work in a lumber mill.

Case 16.—Mr. F. E. H., aged 72, seen, Jan. 5, 1921, had broken compensation, moderate dyspnea and some orthopnea; digestive distress and "palpitation" were troublesome symptoms. He has learned to use digitalis in from 5 to 10 drop doses for dyspnea or beginning symptoms of cardiac decompensation.

Case 17.—Mrs. H. M. E., aged 61, seen, Sept. 7, 1915, in broken compensation, had had rheumatism. At the time of

examination her heart was very irregular, with a pulse deficit. When questioned, she volunteered the information that her heart had been irregular, she knew, for years, probably for fifteen years. Polygrams made at that time showed auricular fibrillation.

This woman of 68 was known to have auricular fibrillation seven years before, when she had been in bed most of the time for five months. For almost a year following there were recurring breaks in compensation, usually of moderate severity, which were always aided by digitalis or strophanthus. She was lost sight of for five years, during which time she has been very comfortable, up and about doing her housework, her chief complaint being gas and palpitation. In spite of fibrillation, she went through a moderately severe attack of bronchopneumonia in 1916.

CASE 18.—Mrs. S. J. F., aged 65, seen, Aug. 8, 1922, complained of dyspnea and constipation. She had been troubled with her heart for six or eight years, and frequent tonsillitis and more or less "rheumatism" for years, but had never been laid up in bed. Electrocardiograms showed auricular fibrillation, with occasional ventricular ectopic beats. She did not respond to digitalis; she could not arrange for bed rest, and it is reported that she died six months later.

CASE 19.—Mrs. M. McC., aged 62, seen in February, 1915, had dyspnea, palpitation and broken compensation with dilatation, dating to overexertion. The heart was irregular; rate, 140; wrist, 100. The systolic blood pressure was 190; diastolic, 105. The liver was three finger breadths below the costal margin. Polygrams showed auricular fibrillation. The urine showed excessive albumin and casts. There was marked and steady improvement on digitalis and rest. The patient has been seen irregularly since, and is fairly comfortable, though she has occasional breaks in compensation.

CASE 20.—Mrs. W. H. McG., aged 46, seen, March 19, 1922, in broken compensation, had not so much dyspnea as extreme weakness and palpitation. The heart was completely irregular, and electrocardiograms showed typical auricular fibrillation. Convalescence was extremely slow in spite of digitalis and bed rest, and at times the prognosis looked very serious, particularly since mental disturbances appeared, such as hallucinations and delusions; at times the patient became almost violent. These gradually cleared up with improvement in the heart, and, five months after the onset, the patient was gradually getting up and about. After undue effort there was another break in compensation, attended by extreme mental confusion, sleeplessness, orthopnea and Cheyne-Stokes breathing, followed by death, Aug. 17, 1922.

CASE 21.—Mrs. S. J., aged 38, seen, July 15, 1919, for three and a half years had palpitation and "severe pains in her heart," and could not sleep because of orthopnea. There was gradual improvement on stropthanthus and digitalis, but after two weeks there was another breakdown from which the patient died in ten days. Mental confusion was a prominent symptom. Polygrams showed definite auricular fibrillation.

CASE 22.—Mrs. D., aged 36, seen, July 22, 1919, had had extreme decompensation for three or four months with remissions and recurrences, and rheumatism at 14, 19 and 25 years of age, when she was in bed from two to five months. The heart was dilated to the midaxillary line; there were mitral insufficiency and auricular fibrillation. The patient died in three months.

CASE 23.—Mr. H. C. W., aged 73, seen in April, 1921, had extreme dyspnea, dilatation of the heart and a completely irregular pulse. Electrocardiograms showed typical auricular fibrillation. After recurrent cardiac breakdowns, he died in October.

CASE 24.—Mrs. C. A. N., aged 49, seen, Jan. 5, 1922, had had chronic arthritis and tonsil infection.

In this patient there was a history of rheumatism and tonsillitis with probable involvement of the heart extending back several years, with more or less broken compensation over the last four years. During our observations she did not have any particular distress from the heart, and died as a result of pelvic carcinoma. Just how long the auricular fibrillation had been present it is difficult to say. Digitalis was of definite help while she was in the hospital.

CASE 25.—Mr. M. M. C., aged 21, seen, Oct. 6, 1921, said that his present trouble dated to May; he had very little cardiac distress, but knew that his heart was irregular. He said he had the same trouble before the tonsils were out in 1916. Electrocardiograms showed typical auricular fibrillation. He has been comfortable since, but the fibrillation persists.

CASE 26.—Mrs. D. W. C., aged 60, was seen in May, 1921, in an acute cardiac breakdown. The heart was quite regular, and there was acute pain in the region of the spleen, which was thought to be due to infarction. When seen a year ago, the heart was not irregular but showed mitral insufficiency. July 11, 1922, when she was able to come to the office, the heart was completely irregular, and the electrocardiograms showed auricular fibrillation.

The onset of her present trouble was with an acute broken compensation, which was controlled by a long rest in bed and very careful attention. Compensation is established so that the patient is quite comfortable.

CASE 27.—Mrs. J. E. W., aged 64, seen, Oct. 27, 1919, had broken compensation of one week's duration. In January, 1922, she went through a cholecystectomy with no heart symptoms, though auricular fibrillation still persists, with no cardiac symptoms.

CASE 28.—Mrs. C. J. S., aged 66, seen, Aug. 23, 1921, complained of "bronchitis" for about a year, fluttering of the heart, choking sensations at times producing shortness of breath, swelling of the face and of the ankles, and occasional nausea. Electrocardiograms showed typical auricular fibrillation. Her course was progressively downward, and she died within five months. Digitalis, however, was of definite value, frequently tiding over periods of broken compensation.

CASE 29.—Mr. P. H., aged 49, seen, Dec. 9, 1917, was in moderate broken compensation, dating to October, 1916, when, duck shooting, he overexerted after a hearty meal. His pulse was then 160, and "he could not breathe." Polygrams showed auricular fibrillation. There was slow improvement on rest and digitalis. He was not seen then until Aug. 16, 1922, when, after driving his automobile 40 miles on a hot day and lifting a 100 pound sack from it, he suddenly became unconscious; when seen three hours later he appeared moribund, with slow, shallow respiration and very irregular, weak pulse. He had been thrashing about in bed, requiring a restraining jacket. A digitalis preparation brought improvement, and in the morning, ten hours later, he was entirely conscious and quiet. He was kept in bed a week, improving steadily on digitalis. Electrocardiograms, August 22, showed fibrillation.

CASE 30.—Mrs. M. M. K., aged 40, seen, Aug. 30, 1922, knew that she had had heart trouble since she was 16, though the cardiac symptoms were not marked. In spite of this, she said that, last summer, at a height of 7,000 feet, she was very well and able to undergo effort without difficulty.

In this woman of 40, with a cardiac history since she was 16 years old, auricular fibrillation was found, and there was very little evidence of heart failure. There was no history of acute rheumatism, but her tonsils were infected and she had had repeated attacks of tonsillitis with fever. She did not know how long the heart had been irregular, although she says that her liver has been enlarged for three or four months and that she had it formerly, off and on. In spite of chronic endocarditis and auricular fibrillation she has very little evidence of heart weakness, and was even able to dance last summer at an elevation of 7,000 feet, without difficulty. She knows that her heart was irregular at that time.

CASE 31.—Mr. J. K., a railroad mechanic, aged 45, seen, Sept. 25, 1922, complained of moderate shortness of breath, considerable palpitation, and pain in the precordium.

While this machinist of 45 is well developed and looks quite well, he in unable to follow his trade because of palpitation and moderate dyspnea on effort. The fibrillation has been present for two or three years. He had been taking digitalis for some months. Because of negative T-waves in the electrocardiograms in all leads, it was thought that this might be a digitalis effect. Digitalis was withdrawn for two weeks when the T waves were positive.

CASE 32.—Mr. G. W., aged 50, seen, Oct. 31, 1922, complained of smothering sensations, particularly at night, so

that he could not lie flat in bed, and shortness of breath with any exertion during the day. He had to give up his work, picking apples, two weeks before, on account of dyspnea.

This laboring man of 50 has a history of severe inflammatory rheumatism in boyhood, and severe typhoid fever at 32. The heart is now completely irregular and has been for an indefinite time. His symptoms are those of mild cardiac weakness, and he is unable to stand slight effort without dyspnea. Digitalis produced a remarkably good effect.

CASE 33.—Mr. E. E. McC., aged 50, seen, Nov. 3, 1922, complained of dyspnea on exertion, with tightness through the chest. He was well developed and well nourished, and did not look ill. There was complete arrhythmia. The left border of the heart was 3 inches outside the normal limits; there was a definite systolic murmur at the apex and a rougher systolic murmur at the aortic area. The arteries were not particularly thickened. The liver was not enlarged. The urine showed a trace of albumin, and some granular and hyaline casts. He did not follow instructions, and his course has been progressively downward.

CASE 34.—Mrs. J. F. S., aged 36, seen in consultation, Aug. 23, 1922, complained of dyspnea, orthopnea, pain over the heart, cough, and swelling of the legs and abdomen during pregnancy. The heart was completely irregular and dilated to the midaxillary line, and a faint systolic murmur was heard with the stronger beats. The heart rate was 130; pulse, 100. The liver was felt four finger breadths below the costal margin; there were marked edema and ascites. She responded favorably to digitalis.

CASE 35.—Mr. J. F. C., aged 69, seen, Nov. 8, 1923, said that the night before, after sitting for two hours in the cold at a stock show, he attempted to drive his car home, when he was seized with a sense of suffocation, with an increasing amount of frothy, blood-tinged sputum. This was so severe that he had to be taken home, the attack lasting for two or three hours. He had had a similar attack two months ago from no apparent cause. When seen the next day, the left heart border was 2 inches beyond the normal limits. For the next week he improved steadily under digitalis and rest, and was able to come to the office on the 17th, when an electrocardiogram showed definite typical auricular fibrillation with auricular extopic beats. His improvement from this time on was steady. January 9, he went on a motor trip to California, standing the trip very well and returning much improved. Since then he has been able to attend to his business. May 2, he had another attack of pulmonary edema; he awoke at 2 a. m., and it lasted about two hours. Electrocardiograms made three days later showed normal rhythm.

In this man of 69, who looks well and now shows but little evidence of lessened cardiac reserve, there is a history of endocardial involvement, and he shows atheromatous changes. He has had at least four acute cardiac breakdowns, the chief symptom being pulmonary edema. In the first attack, auricular fibrillation seemed to be paroxysmal and lasted three or four days, while in the second attack it was apparently of short duration. Judicious use of digitalis has now brought about cardiac compensation.

CASE 36.—Mrs. C. V. D., aged 45, was seen, March 23, 1923, for examination. Compensation was good, although she knew that the heart had been involved for twenty-five years, because at that time she had acute rheumatism, being in bed for four months. The heart had probably been irregular for years, and she thought the physician said that she had mitral stenosis at the time of the confinements. The liver was one finger breadth below the costal margin, and was slightly tender.

This healthy appearing woman of 45 shows but little evidence of cardiac embarrassment in spite of a long-standing mitral stenosis and auricular fibrillation of some years' duration.

CASE 37.—Mr. F. W., aged 45, was seen, Jan. 27, 1923, with a heart attack. Electrocardiograms showed typical auricular fibrillation, with right ventricular ectopic beats. He dated his trouble back three years, when he had arthritis, some palpitation, and cough. He has improved so much that he is able to attend to his business.

SUMMARY

In a group of patients with auricular fibrillation, about three fourths are ambulatory, while one fourth have died. Half of the entire number are comfortable and able to carry on their daily activities without cardiac symptoms. Some of these have decreased reserve on unusual effort. About one fifth of the entire number have more marked limitation of cardiac reserve, and while ambulatory, are more or less incapacitated. Most of these have needed digitalis at one time or another, or have learned how to use it to safeguard the heart. The heart is able to adjust itself to auricular fibrillation, and to compensate as it does in valvular lesions. When both fibrillation and valvular lesions (or cardiosclerosis) are present it may still compensate well for months or years, the prognosis depending on the sum total of symptoms and signs which indicate cardiac function.

Evidences of myocardial weakness are largely clinical, but changes in the Q-R-S-T complexes, in repeated electrocardiograms, aid in measuring the progress of degenerative changes.

512 Journal Building.

ABSTRACT OF DISCUSSION

ON PAPERS OF DRS. WENCKEBACH, REED AND COFFEN*

DR. EMANUEL LIBMAN, New York: Apart from the influence of exertion and emotional disturbances in bringing about fibrillation, this condition may, as Dr. Coffen stated, occur in the presence of a heart which is the seat of an organic change or in the absence of organic disease. It is well known that large goiters can cause fibrillation whether or not marked toxic manifestations are present, but sufficient attention is not paid to cases of fibrillation occurring in connection with even small goiters which have a tendency to extend down behind the sternoclavicular joints. Various infections can cause fibrillation. Dr. Rothschild observed the remarkable case of a boy who was incapacitated because of fibrillation persisting for eight months. The condition disappeared within a few days after tonsillectomy, and has now remained absent for six years. It is well known that infections of the gallbladder can cause fibrillation. Sometime ago I observed the development of this condition in an elderly man at the time he developed a renal infection due to calculi. The fibrillation disappeared within twenty-four hours after the kidney was drained. Intestinal disorders can bring about fibrillation. Auricular fibrillation lasting even several weeks may, at times, be relieved by care of the intestinal tract. The chronic digitalis treatment of fibrillation has been of particular value to patients because it leads to their being kept under observation. Fibrillating hearts often withstand operative procedures surprisingly well. The outlook in cases of fibrillation is worse in those patients in whom there is present an affection of the coronary arteries, and, as Dr. Coffen has stated, the prognosis is worse if there are found abnormal ventricular complexes or changes in the electrocardiogram which are characteristic of arborization block. We have found that subacute streptococcus endocarditis hardly ever occurs in patients who are suffering from fibrillation of the auricles and that, on the other hand, it is unusual for fibrillation or flutter to develop in a patient who has already suffered from subacute streptococcus endocarditis. The application of quinidin in the cases of fibrillation in our hospital was carried on by Drs. Oppenheimer and Mann. Their results are about the same as those observed elsewhere. They did not see an embolism in fifty cases. It is evident that, in cases of auricular fibrillation occurring in connection with organic disease of the heart, the factors may operate which cause fibrillation in hearts not the seat of organic change. It is important, therefore, that all these causes be looked for when the organic disease by itself might appear to be the sole cause of fibrillation.

* See paper by Dr. K. F. Wenckebach, this issue.

DR. A. W. HEWLETT, San Francisco: In the treatment of the minor cardiac irregularities, it has been my custom to give the elixir of iron, quinin and strychnin as a tonic. Recently one of my patients, suffering from paroxysmal tachycardia, came back most enthusiastic about this new medicine, which she felt had lessened the number of her attacks. Subsequent experience with quinidin proved that, in this particular patient, the paroxysms were still further lessened by this drug. Quinidin will restore the sinus rhythm in a considerable proportion of patients suffering from auricular fibrillation. The administration of quinidin is attended with some, though not a great amount, of danger. The question arises how much good is accomplished by restoring a sinus rhythm. It is true that some patients with auricular fibrillation appear to get along very well, some of them being able for years to attend to their regular duties. But such good compensation is exceptional. The great majority of patients with auricular fibrillation are more or less incapacitated. Is this incapacity due to the auricular fibrillation itself, or is it due to an associated disease of the heart, such as a valvular or a myocardial lesion? A recent study of the vital capacity of patients with heart disease seems to throw light on this question. In a general way, it may be said that the vital capacities of patients suffering from heart disease indicate, roughly, the degree of decompensation, particularly as regards pulmonary congestion and the symptom of dyspnea. We found, in analyzing the vital capacity records of 500 men who were sent to the electrocardiac room because some cardiac disease was suspected, that there were fifty-three with auricular fibrillation. The average vital capacity of these fifty-three men was 64 per cent. of the standard that is normal among college students. The average vital capacity of the patients with no demonstrable organic disease was 94 per cent. Thus, the auricular fibrillation patients made a much worse showing. But what struck me particularly was that only one of these fifty-three patients had a vital capacity that was above the average normal, whereas, one third of these other patients suspected of having heart trouble had a vital capacity above the average. In other words, taking auricular fibrillation patients as they come, it is quite exceptional for such patients to show a normal vital capacity. And I infer that it is also exceptional for such patients to have a normal cardiac response when put to any severe test. We also studied the effect of changes of rhythm on the vital capacities of these patients. Sometimes a patient with a regular rhythm would develop fibrillation under observation, and sometimes his fibrillation disappeared, either spontaneously or under the administration of quinidin. In brief, we observed that, when the record of vital capacity was taken shortly after a change of rhythm, there was no striking effect on the vital capacity. In some cases, when the patient was given quinidin and his heart became regular, the vital capacity, when it became regular, was, if anything, a little lower than before. On the whole, however, it remained about the same, and there was no striking immediate effect. On the other hand, we were able to follow six patients for some time after the change in rhythm had occurred. In five of these cases we found a very striking effect. Although the vital capacity did not change much immediately after the rhythm became regular, it gradually improved as time went on; conversely, when the rhythm became irregular, the vital capacity gradually fell until it ultimately reached a much lower level. I believe, then, that fibrillation in itself affects the vital capacity unfavorably, but that it acts in a gradual manner, probably by gradually disturbing the circulation in the lungs, thus lowering the vital capacity. It seems to me, therefore, that in the vast majority of cases, the fibrillation itself is disadvantageous, and that, if we can get the patient free of the fibrillation and keep him free, he stands a better chance to maintain compensation than if we allow it to go on. I know, of course, that this is the opinion generally held, but I am trying to present other evidence in support of it, because, from time to time, the assertion is made that fibrillation is a thing which, in itself, is not serious.

DR. WILLIAM J. KERR, San Francisco: The various toxic effects described by Dr. Reid have been observed by various workers. I think it should be emphasized that many of these irregularities may occur when digitalis has not been given, when other drugs have been used, or when no drugs at all have been used. The most interesting observation he has made is noting accelerated sinus rhythm in association with partial block. I have not observed this. The reports of ventricular ectopic tachycardia are also extremely interesting. I think it should be emphasized, also, that that may occur when digitalis has not been given. Since we have been more interested in disturbed mechanism of the heart, more of these tachycardias have been observed. I made such an observation in a patient with a complete heart block, who was being treated with quinidin. During the course of treatment there were attacks of syncope which were accompanied by unusual runs of ventricular tachycardia. Dr. Reid showed a very interesting record of this type of tachycardia, which was about 200 to the minute. In the particular patient that I saw, the heart was beating violently, the pulse was of high tension, and the patient was in syncope. The electrocardiographic records were very similar to those shown by Dr. Reid, and seemed to represent a type of circus movement in the ventricle. This patient later had several attacks of ventricular fibrillation, three of which we observed, and he is still alive, almost two years following these attacks. He is the only patient I know of who has survived for more than about thirty hours following attacks of ventricular fibrillation. I think that when we have an opportunity to study more patients with serious cardiac conditions and observe electrocardiographic records of various stages of their illness, we shall find that ventricular fibrillation itself, which has been considered incompatible with life, is much commoner than we now suspect. In regard to the Eggleston method of treatment, it does not seem to me that in cases manifesting no marked signs of decompensation, and no fibrillation, there is any justification for giving digitalis in tremendous doses at the onset of the treatment. There is no indication for getting toxic effects sooner than two or three days, in most instances. The method has taught us the value of rapid digitalization. My own particular method is to use about 4 c.c. of a standard tincture, or about 0.4 gm. of a known preparation of the leaf, about six hours apart, until the desired effects have been achieved. I should like to commend Dr. Coffen. I think that we have been swayed by instrumental methods in the study of heart disease. We have observed more and more patients suffering from this irregularity, and I think we should appreciate the fact that paroxysmal auricular fibrillation, paroxysmal flutter and paroxysmal tachycardia are extremely common, and paroxysmal auricular fibrillation is particularly common, and in many instances is not associated with any pathologic condition of the heart that we are able to demonstrate. We observe, however, in many of these cases, and, particularly, in those in which there is associated mitral disease, that the paroxysms come on more and more frequently, with longer and longer duration, and, finally, become permanently established. In the sclerotic heart, on the other hand, in patients past 40 or 50, auricular fibrillation may come on without paroxysms, and may seem to be a permanent condition.

DR. CARY EGGLESTON, New York: The figure which Dr. Reid used for the average body weight dose is that for the purified tincture, and is 50 per cent. too small for galenic tinctures, especially when administration was extended over several days. Hastily correcting his figures to fit galenic preparations, it appears that in every case recorded as showing serious toxic symptoms the total dose given was much above the average originally established on the basis of body weight. Dr. Reid's observations are strongly confirmatory of the safety of the body weight method of estimation of the dose of digitalis, when employed with due attention to details. The doses recorded by Dr. Reid are excessive, because he was seeking to study patients who had been poisoned, not because he deliberately employed such doses. I have seen a number of similar instances of excessive administration, but almost never when the body weight method was being followed, perhaps because it is somewhat feared, and those who try it are more cautious than those who do not. I have seen one death from digitalis which closely corresponds to one recorded by Dr. Reid. The patient had

been given digitalis by the body weight method with satisfactory temporary response, and it had been discontinued. Through an error, large doses were again prescribed without due control, and after a few days the patient developed ectopic ventricular tachycardia and died in ventricular fibrillation. This is the only digitalis death I have come across in many hundreds of patients, and it was attributable to uncontrolled digitalis administration, not to the use of the body weight method. In this connection let me mention a series of automatic stop orders for all forms of digitalis administration which we have posted in every ward, and which the nurses are required to observe. They have proved most satisfactory in preventing accidents. They read: "Digitalis is to be discontinued and the house physician notified if nausea or vomiting develops; if the heart rate falls to or below 60; if a previously regular pulse becomes irregular." I would add, "if a previously slow pulse becomes markedly accelerated." Dr. Kerr said that he did not think the body weight method was applicable to patients showing only mild degrees of cardiac failure, and I quite agree with him if he refers to the administration of large initial doses. Except in the original researches on the method, it has never been applied to such patients in that way, although the average total dose is always employed to guide the administration of digitalis in every case, and to give an estimate of the progress of digitalization which we find very valuable.

DR. PAUL D. WHITE, Boston: I agree heartily with Dr. Coffen that auricular fibrillation per se is not serious. How much more, for example, do we prefer to see patients with rheumatic heart disease and auricular fibrillation rather than with syphilitic heart disease and normal rhythm. There is here a very distinct difference in prognosis. As a matter of fact, auricular fibrillation is relatively uncommon in syphilitic heart disease. I agree with Dr. Kerr that paroxysmal auricular fibrillation is very common, and yet it is often overlooked, in fact, it is usually overlooked. The condition is likely to be called acute dilatation of the heart, and as the physician listens to the heart which is beating very rapidly and irregularly in delirium cordis he becomes alarmed and often gives an unfavorable prognosis. Then the paroxysm stops suddenly, and the so-called acute dilatation is gone. Also paroxysmal auricular fibrillation is sometimes mistaken for angina pectoris, that is, when only a vague history is obtained. I have seen this happen repeatedly. Of course, a bad prognosis is often given if angina pectoris is suspected; but if a clear history of auricular fibrillation can be obtained, one can then give a fairly good prognosis, if that is the only disturbance present. Last year, at St. Louis, I reported the work done at the Massachusetts General Hospital in the administration of quinidin to about seventy patients with auricular fibrillation. These cases were unselected. We concluded, as a result of that series, that the cases most favorably treated by quinidin were those of recent onset, and without marked mitral stenosis or cardiac failure. Our conclusions are the same this year, after continuing the series. Quinidin in auricular fibrillation is particularly useful in cases of recent origin, and as a prophylactic against paroxysmal auricular fibrillation. It is in this paroxysmal type that I have had the most striking success. There are patients who have been taking quinidin sulphate every day for months or a year or more who get along without the frequent paroxysms which used to disturb them. Although, in itself, paroxysmal auricular fibrillation is not a serious condition, it is very disturbing, and the patients are grateful, especially those who are nervous and sensitive, if these paroxysms can be abolished. We have lately also found that premature beats are not infrequently prevented and abolished by the use of quinidin. But I feel that in paroxysmal auricular fibrillation quinidin is most useful.

DR. WILLIAM DUNCAN REID, Boston: As to the question of the large doses used with these patients, I am thoroughly in agreement with the statement that they were given too much. I did not treat those patients, but I had the opportunity to study them under various medical services. It was my endeavor to show that the troubles appeared to be due to overdoses. In using digitalis, it does not work out that if some digitalis helps to a certain extent, giving more of the drug will help more. That does not follow. It seems to me worthy of emphasis that this method which Dr. Eggleston has introduced, of giving digitalis in relation to the body weight of the patient, should not suffer harm from men who forget the safeguards.

DR. T. HOMER COFFEN, Portland, Ore.: I am particularly grateful to Dr. Libman for emphasizing again some of the etiologic factors in the production of auricular fibrillation, especially in regard to the thyroid, to tonsil infection and to intestinal disturbances. Hidden or latent thyroid cases are often overlooked, when care in regard to physical examination, such as he has spoken of, plus basal metabolism estimation, may throw light on an otherwise obscure condition. There is no one better able to discuss the relation of endocarditis and auricular fibrillation than Dr. Libman, whose work stands alone in this respect. In regard to quinidin, I think that Dr. Hewlett and I have no disagreement. I have access to the electrocardiograph only for ambulatory patients. I have been led to be very cautious about the use of quinidin in ambulatory cases, though it may be used safely in large enough doses to change the arrhythmia to a normal rhythm in bed patients. Perhaps it can be used in smaller amounts with safety, especially in cases of paroxysmal auricular fibrillation which tend to become permanent. If this condition can be checked, and the tendency to a permanent fibrillation avoided by the use of quinidin in safe amounts which can be controlled, of course, it is well worth while. I want to emphasize again that the physician in general practice may recognize this very common arrhythmia by simple means and without the electrocardiograph and other instruments, and that, in many cases, the heart adapts itself to the irregular rhythm and carries on for months or years.

THE VALUE OF FORCING FLUID IN THE TREATMENT OF MERCURIC CHLORID POISONING*

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In 1915, Lambert and Patterson [1] said:

> The therapeutics of mercuric chlorid poisoning up to the present have been quite unsatisfactory. The patients have regularly developed anuria on or about the fourth day after taking the poison, and progressed to subsequent death from lesions of the liver and colon, with or without the reestablishment of urinary secretion.

This statement represents fairly well the pessimism prevailing at that time with regard to the prognosis in clinical poisoning by mercuric chlorid. Nevertheless, these authors were able to report recovery in all of ten cases which were treated by a method in which measures designed to hasten elimination of the metal were especially stressed. Since the appearance of the paper by Lambert and Patterson, other observers have seen similar good results occur in mercuric chlorid poisoning when this eliminative treatment has been employed. The rigid application of the Lambert-Patterson treatment subjects the patient to a considerable amount of discomfort—discomfort which should be considered of minor importance if it contributes to recovery, but which the patient should be spared unless it is actually necessary.

In the fall of 1916, experiments were undertaken in this laboratory with the object of determining the value

* From the Laboratory of Pharmacology, Medical College of Virginia.
1. Lambert, S. W., and Patterson, H. S.: Poisoning by Mercuric Chlorid and Its Treatment, Arch. Int. Med. **16**: 865 (Nov.) 1915.

of forced fluid administration to dogs suffering from experimental mercury poisoning. These initial experiments require only brief mention. Discouraged by the first attempts, we felt that a satisfactory determination of the toxicity of mercuric chlorid in a quantitative sense, after its oral administration to dogs, was almost impossible; so recourse was had to the subcutaneous administration of solutions of this salt. It has been our experience that recovery occurs practically always in untreated dogs after the subcutaneous injection of 10 mg. of mercuric chlorid per kilogram of body weight; while death is usually produced by a dose of 15 mg. per kilogram, unless some form of treatment is employed. If, however, as much as 20 mg. per kilogram is given and the dog subsequently receives large amounts of physiologic sodium chlorid solution intravenously or subcutaneously, recovery often occurs; indeed, in the majority of instances.

Our experiments had progressed to this stage when Sansum's [2] paper on mercuric chlorid poisoning appeared. According to this author, the minimal surely fatal dose of intravenously injected mercuric chlorid for dogs is 4 mg. per kilogram; recovery will occur in some cases if a slightly smaller dose is employed. If, however, 4 mg. per kilogram is injected, death will occur regardless of the method of treatment. His results indicate that efforts directed toward hastening elimination of the poison are fruitless, and that the only line of successful endeavor in treating mercuric chlorid poisoning is prevention of absorption. Superficially, it would seem useless, therefore, to force fluid; the prime object of which in the Lambert-Patterson treatment is, apparently, to hasten elimination.

Intravenous injection of the poison does not reproduce the conditions usually encountered clinically; here, in the great majority of cases, the mercuric chlorid has been taken orally. It seemed very desirable, therefore, again to attempt to determine the fatal dose of mercuric chlorid by oral administration to dogs. As Sansum has pointed out, the two factors that militate most strongly against accurate determination of the fatal dose of orally administered mercuric chlorid are emesis and a varying glycogen content of the liver. By following the technic to be described, the importance of these factors seems to be so reduced as to permit of the determination of the minimal fatal dose of mercuric chlorid, after its oral administration, with at least a fair approximation of accuracy.

TABLE 1.—*Toxicity of Mercuric Chlorid Administered Orally to Dogs*

Wt. Kg.	Mercuric Chlorid Mg. per Kg.	Result
3.70	15	Recovered
4.59	15	Recovered
7.20	20	Died in 7 days*
15.00	20	Died in 2 days
3.40	20	Died in 2 days
5.22	20	Died in 6 days
5.13	20	Died in 4 days
8.00	20	Died in 1 day
4.63	20	Died in 2 days
4.40	20	Died in 2 days
4.13	20	Died in 4 days
5.22	20	Died in 2 days
4.14	20	Died in 2 days
4.68	20	Died in 2 days
5.23	20	Died in 2 days
4.68	20	Died in 2 days
6.24	20	Died in 5 days
15.90	25	Died in 2 days
9.30	25	Died in 1 day
15.45	25	Died in 2 days
14.54	25	Died in 2 days
13.62	25	Died in 3 days
13.18	25	Died in 1 day
10.90	25	Died in 2 days

*The time mentioned is approximate; if death occurred in the first twenty-four hours, it was "1 day"; in the second twenty-four hours, "2 days."

All of the dogs used were given 10 c.c. of tap water per kilogram of body weight, twenty-four hours before the administration of the mercuric chlorid. After receiving the water, they were placed in cages and given no food or water until the following day. At the expiration of twenty-four hours, the animals received a subcutaneous injection of morphin sulphate, 20 mg. per kilogram; and in thirty minutes, the mercuric chlorid was given through a stomach tube, a solution of 5 per cent. strength being used. The results obtained are given in Table 1.

TABLE 2.—*Results of Forcing Fluid in Dogs That Received a Fatal Dose (20 Mg. per Kg.) of Mercuric Chlorid Orally*

Wt. Kg.	Number of Minutes Before Treatment Was Started	Result
6.81	255	Died in 11 days
4.54	30	Died in 8 days
6.27	30	Died in 11 days
3.77	30	Died in 3 days
8.60	30	Died in 18 days
7.78	255	Survived
7.15	30	Survived
5.72	30	Survived
5.60	30	Survived
4.05	30	Survived
5.90	30	Survived
7.30	30	Survived
9.00	30	Survived
5.50	30	Survived
6.50	30	Survived
9.00	30	Survived
3.60	30	Survived
16.30	30	Survived
11.60	30	Survived
7.50	30	Survived
7.70	30	Survived
9.70	30	Survived
5.40	30	Survived
8.60	30	Survived
8.10	30	Survived

In spite of the morphin administration, emesis occurs in a certain number of cases; but, if this does not take place within thirty minutes after the mercuric chlorid is given, a fatal outcome is not prevented in the untreated dogs after 20 mg. of the poison per kilogram. The only two dogs given the dose of 15 mg. per kilogram recovered. It is possible that this dose will prove fatal in some cases; but, after all, to estimate the value of a therapeutic procedure, it is necessary only to show that it will prove successful after the fatal dose of the poison; and from our experiments, it seems safe to conclude that 20 mg. of mercuric chlorid per kilogram body weight, administered to dogs in the manner described, will prove fatal in the great majority of cases unless some form of treatment is employed.

Having determined the fatal dose of mercuric chlorid, we attempted to ascertain whether dogs could be saved after this dose. The mercury was given to the treated dogs in the same manner as to the controls. After allowing from thirty minutes to a little more than two hours to elapse, we gave the dogs an injection, into the jugular vein, of 25 c.c. of an 0.8 per cent. saline solution per kilogram of body weight; this was followed by injection of a similar amount either subcutaneously or intraperitoneally. The animals were kept in metabolism cages, and intraperitoneal injection of 50 c.c. of salt solution per kilogram of body weight was repeated daily for varying lengths of time, until death or apparent recovery. We arbitrarily selected one month as a time limit; if the dog was in good con-

2. Sansum, W. D.: The Principles of Treatment in Mercuric Chlorid Poisoning, J. A. M. A. **70**: 824 (March 23) 1918.

dition at this time, it was considered as having "survived." The results obtained in the treated animals are given in Table 2.

It is evident from these figures that a definitely favorable influence is exerted by the use of large amounts of physiologic sodium chlorid solution in dogs poisoned by mercuric chlorid. Thus, of the twenty-five dogs receiving the fatal dose of 20 mg. of mercuric chlorid per kilogram of body weight, and subsequently treated by intravenous subcutaneous and intraperitoneal injections of large amounts of saline solution, twenty survived.

The means by which this favorable influence is exerted is not clear. Our first explanation, in the case of the dogs poisoned by subcutaneous injection of the mercury, was that the salt solution simply hastened elimination of the poison. But that this is not correct seems proved by the experience of Sansum, whose more efficient methods of producing diuresis invariably failed to cause the recovery of a dog, once the minimal fatal dose of mercuric chlorid had been given intravenously. In view of Sansum's work, it would seem more probable that saline injections are beneficial through delaying or preventing absorption from the subcutaneous tissues or the lumen of the alimentary tract. Theoretically, at least, it would seem that the oral administration of some cathartic salt in large doses would prove even more effective than the intravenous injection of sodium chlorid solutions. Practically, we have not yet been able to prove that this is the case. In a few experiments, entirely too few to place much dependence on, it seemed that the oral administration of large volumes of water was decidedly less effective than the intravenous injection of the salt solution.

So far as our experiments justify conclusions, it seems permissible to state that the intravenous injection of salt solutions comparatively soon after oral ingestion of mercuric chlorid, possesses a definitely beneficial action and effects the recovery of animals that have received what is probably the surely fatal dose for untreated dogs.

MALARIA IN SAN FRANCISCO*

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Thanks to the better organization of health boards and the awakening of the public to the fact that the presence of a preventable disease represents a criminal waste of money, malaria is yearly becoming less frequent. For several years it has been noticed that the occurrence of a case in the wards or in the clinic arouses great interest among the students, and the day seems not far distant when we shall have considerable difficulty in teaching by bedside and microscope the natural history of malaria in all but a very few medical schools. This is unfortunate, for there still are rural districts in California and in other states where malaria constitutes a fair proportion of every-day medical practice, and lack of familiarity with the parasite is a very real handicap to the conscientious physician.

For the last ten years I have been interested in the disease as it has been seen about San Francisco Bay, and this article is the result of observation of 143 cases. Long a vigorous upholder of the dictum that diagnosis should depend solely on the demonstration of the plasmodium, I have directed especial attention to the type of organisms present, and have myself studied the parasite in every instance. The material is that afforded by general adult medical practice in civil life, the cases occurring in the University of California Hospital, the university service of the San Francisco Hospital, a few in the Student's Infirmary in Berkeley, and the rest in private work. In the government service hospitals about the bay, doubtless a much greater number of cases of tropical origin could have been seen, but this material was not desired since the chief point of interest was the study of malaria as a strictly "domestic" and not "imported" disease. As San Francisco represents the geographic as well as the commercial center of California, it was thought that the malaria incidence here might be taken as a sample of the incidence throughout the state, and comparison of the present statistics with the statistics of the state board of health show a very considerable agreement, as regards not only the type of infection but also the localities. Since all but fourteen patients acquired their infection within the state, we have, then, a study of malaria as it exists in California, taken with San Francisco as a sampling point.

Naturally, the point of first interest was the type of infection. It is felt generally among local physicians that the estivo-autumnal variety is rare; but this is an error, as shown later. The differentiation is of considerable importance, as tertian malaria does not demand so strenuous treatment and the human host is not a carrier for so long a period. The distinction is made partly from the fever course, but better still from the blood examination. Quartan malaria is extremely rare in California, and although reported on one occasion by Geiger and Kelly, it was not seen in the present series. The fever paroxysm in the tertian type has as its characteristic a very rapid rise and return to normal, the whole affair usually being over in ten or twelve hours, while in the estivo-autumnal type the paroxysm may be prolonged further or even take on the type of a continuous fever.

Careful study of the blood, however, is more certain. The asexual estivo-autumnal parasite, being only slightly ameboid, becomes lodged in the capillaries after it has attained about one fourth of its growth, consequently disappearing from the circulating blood in about twelve hours. This is simply because the red cells carrying the older organisms are unable to accommodate themselves to the smaller calibered capillaries and become blocked by virtue of this mechanical obstacle. This explains the nonappearance of pigmented forms, the difficulty of finding parasites in many instances, and the fact that at times parasites may be numerous on one examination and yet missing a few hours later.

On the other hand, the more ameboid tertian form can squeeze its way through the capillaries with the red cell, and so parasites in all stages of growth may be found in the circulating blood. If, therefore, pigmented forms are discovered in the smear, one may be certain that a tertian infection is present, while if nothing but hyaline forms are seen on two successive examinations a few hours apart, one may be equally sure he is dealing with an estivo-autumnal form. In this way a diagnosis can be made much earlier than if the usual method is followed of waiting for the crescents and ovoids to appear. Ordinarily, the criterion of estivo-autumnal malaria is the occurrence of these sexual forms; but as they do not develop until the infec-

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tion has existed about ten days, it can readily be understood why a number of cases are mislabeled tertian if seen earlier. Doubtless this accounts for the prevalent erroneous impression regarding the rarity of estivo-autumnal malaria. If the disease has persisted more than a few days and nothing but hyaline rings are found on the first examination, no subsequent examination is necessary, as, in a tertian infection of this duration, some of the generations of parasites certainly would have overlapped and forms showing pigment would occur. Crescents are necessary to establish a diagnosis of the estivo-autumnal type only in the case of a mixed infection in which the two varieties exist together.

In examining the blood, a good Romanowsky stain, thin, even smears, a knowledge of the parasite and patience are the prime requisites in the order named. Many times parasites have been overlooked because the stain was too acid or faint or the smear too thick, and equally often blood platelets and débris have been called plasmodia because the examiner was not sufficiently familiar with the organism.

Of the present series, 100, or 69.9 per cent., were tertian, thirty-nine, or 27.3 per cent., estivo-autumnal, and four, or 2.8 per cent., a mixture of both varieties. This brings the frequency of tertian to estivo-autumnal as 2.5:1, a ratio considerably lower than is usually thought. In the 129 strictly California cases, the proportion of tertian to estivo-autumnal was a trifle higher, the figures being ninety-three tertian, thirty-three estivo-autumnal and three mixed; while in the other fourteen, coming mainly from the tropics, the figures were seven tertian, six estivo-autumnal and one mixed. Of the 104 tertian infections, sixty-three were of the single type and forty-one were double.

Next in interest is the region in which the disease was contracted. In nearly all cases the locality was ascertained in detail and the nearest town given, although in a few, less definite locations, such as "Sacramento Valley" and "Sacramento River," were all that could be obtained. In Figure 1 *A* the places of origin of the estivo-autumnal cases are indicated by dots on the outline map, while in Figure 1 *B* the same is done for the tertian. It will be noticed that the great majority of both types come from what is known as the "Upper Sacramento Valley." A large portion of California consists of a great central plateau, the Sacramento and San Joaquin valleys, named from the rivers draining them and rimmed in by the two great mountain chains, the Sierra Nevada and the Coast Range. This region is approximately 450 miles long and 80 miles wide, and is devoted almost entirely to agriculture. Level, warm and with abundant water, it constitutes an ideal home for *Anopheles,* which is universally present. The fact that the upper or northern portion of this region has more water probably explains the greater prevalence of malaria there.

The three cases of apparently unquestionable infection in San Francisco will bear mention. Two of the patients were dock laborers, and the other lived near the water front. Considerable agricultural produce is brought to the city by river boats, which carry, as unwelcome supercargoes, hoards of mosquitoes, so that it is very possible that infection conveyed in this way may be acquired in San Francisco along the water front.

It is well known that a person may harbor parasites for long periods without symptoms, only to have a paroxysm on going to a colder climate or after some unusual physical event. Especial attention therefore was paid to the locality in which the symptoms developed. In 104 patients in whom this was noted, fifty-eight had their first symptoms at the place of infection and came to San Francisco afterward. In forty-six, however, symptoms did not develop until they came to the city for some other reason. Eighteen arrived within a few days of being bitten by mosquitoes in an infected district; so this may be considered as the ordinary period of incubation and multiplication of the parasites to a sufficient number to give a paroxysm.

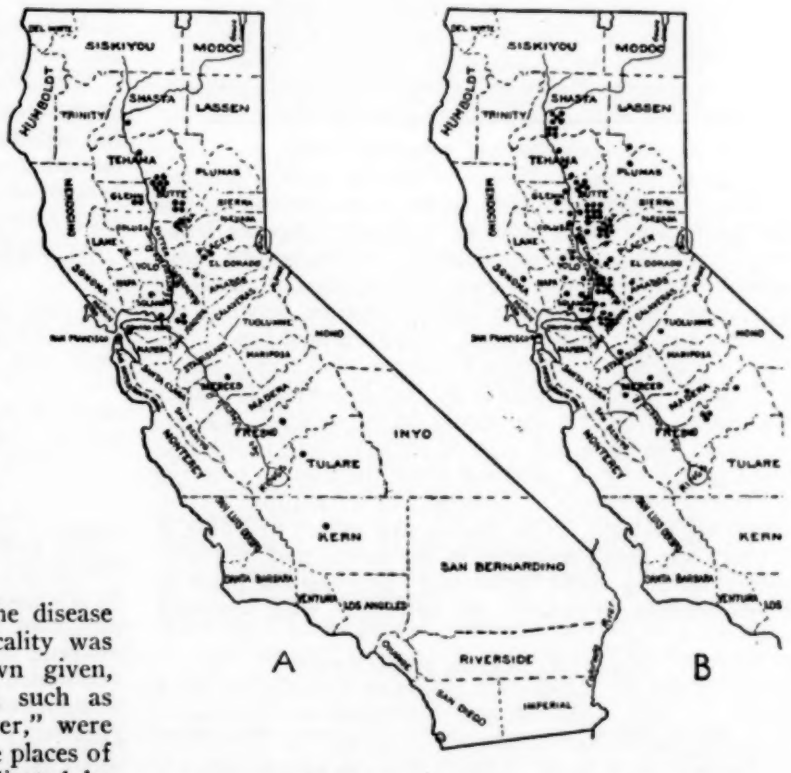

Fig. 1.—Location of: *A,* estivo-autumnal cases; *B,* tertian cases.

Twenty-seven, however, gave histories of attacks in the past but none very recently, and it was frequently in this group that the development of symptoms was noted after some physical insult. A number of cases followed operations or labor; two followed the passage of esophageal bougies. A student, without known previous attacks but recently coming from an infected town, developed a tertian paroxysm five days after she was used as a donor for a transfusion. The recipient did not acquire the infection.

The month in which the cases came under observation was noted in all. This does not necessarily mean the month of infection, but denotes the time the patients were seen here. The incidence by months it shown by the curve in Figure 2. As would be expected, there is a very definite peak in the late summer months, with the maximum in September, exactly as observed for many Southern states in *Public Health Reports.* This is due to several factors: the natural tendency of the disease to increase during the mosquito season; the

return from vacations spent in malarial districts, and the migration to the city of floating workers after the summer harvest.

As regards sex, males outnumbered females just four to one, a fact not surprising since the material consisted largely of the laborer and artisan class. The predominant occupation was that of an outdoor worker.

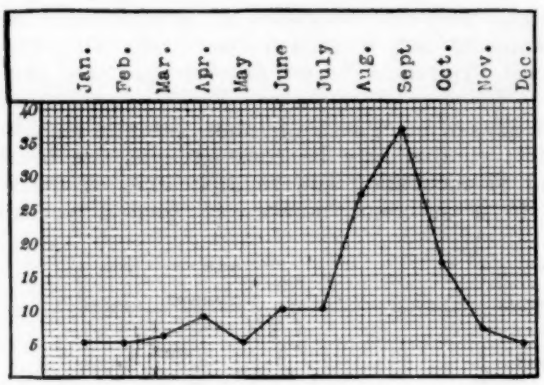

Fig. 2.—Incidence of malaria by months.

The condition of the spleen was noted in 137 instances, only those spleens definitely palpable being considered as enlarged (Table 1). The results show splenomegaly to be a very constant sign in malarial infections, with but very little difference between the incidence in the tertian and estivo-autumnal types.

The presence or absence of herpes also was noted in 137 cases. It was usually labial, but in several instances was aural, and in two appeared on the eyelids. Herpes is a much less constant sign of malaria than is enlargement of the spleen, but here again there is no material difference between the incidence in tertian and estivo-autumnal malaria. The figures are shown in Table 2.

Only one death occurred in the series, and, unfortunately, nothing could be learned regarding the place or circumstances in which the infection was acquired.

TABLE 1.—*Condition of the Spleen*

Type of Malaria	Per Cent. Enlarged	Per Cent. Not Enlarged
All cases	78.8	21.2
Tertian	76.8	23.2
Estivo-autumnal	81.5	18.5
Mixed	100.0	0

TABLE 2.—*Incidence of Herpes*

Type of Malaria	Per Cent. Herpes Present	Per Cent. Herpes Absent
All cases	39.4	60.6
Tertian	40.6	59.4
Estivo-autumnal	36.8	63.2
Mixed	33.3	66.7

The man was admitted in coma from the city prison, where he had been lodged on account of supposed drunkenness. Blood smears showed immense numbers of estivo-autumnal hyaline forms, and he died in thirty-six hours in spite of all treatment. Postmortem examination revealed no other cause for death.

SUMMARY

One hundred and forty-three cases of proved malaria seen in San Francisco were analyzed with especial reference to the type of parasite and the locality in which infection occurred. San Francisco may be considered a fair sampling point for malaria in California, as the sites of origin of these cases correspond closely with the malarial regions of the state, as shown by state board of health surveys.

Estivo-autumnal malaria is found more commonly than is supposed, the proportion to tertian being 1:2.5. Diagnosis of this type by blood smears should be made oftener, and the sexual forms should not be considered the sole criterion. The absence of pigmented forms in the circulating blood offers a sharp diagnostic point.

Many patients did not develop their illness at the site of infection, but symptoms started after they reached San Francisco. In some this is accounted for by the natural incubation time; but, in the majority, recrudescences were brought about by the change to a colder climate or by some physical trauma, such as labor or operation.

As in other states, the incidence was greatest in the late summer months, with the maximum in September.

Palpable enlargement of the spleen was found in approximately 80 per cent. of the series, and no essential difference was noted between its occurrence in the tertian and estivo-autumnal infections. Herpes was present in approximately 40 per cent., likewise with no difference in the two infections.

240 Stockton Street.

UNCOMPENSATED ALKALOSIS IN ENCEPHALITIS *

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The possible conditions of the acid-base balance of the blood, considering as variables the amount of bicarbonate present, and the hydrogen-ion concentration, have recently been defined by Van Slyke.[1] Three of these variations, (*a*) the normal condition of health (in which both bicarbonate and p_H are within normal limits), and the conditions of (*b*) compensated acidosis (normal p_H, low bicarbonate), and of (*c*) uncompensated acidosis (low p_H, low bicarbonate), are the ones most commonly observed. Several of the other theoretical possibilities have been reported as occurring either experimentally or clinically. The present communication is for the purpose of reporting a case of epidemic (lethargic) encephalitis with a disturbance of the respiratory mechanism producing a prolonged, extremely rapid, shallow type of breathing. So far as we have been able to discover, the condition of the acid-base equilibrium which was found has not previously been described as occurring in this condition.

An unmarried housemaid, aged 22, and healthy until the onset of her present illness, seven days before admission to the hospital had suffered from severe headache and drowsiness, followed by a twenty-four hour period of marked restlessness and sleeplessness. She then suffered from increasing drowsiness up to the time of admission. There was no history of recent respiratory infection, diplopia or other palsies. On admission, except for coma and occasional muscular twitchings involving the face and legs, there was nothing

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1. Van Slyke, D. D.: Studies of Acidosis: Normal and Abnormal Variations in the Acid-Base Balance of the Blood, J. Biol. Chem. 48: 153 (Sept.) 1921.

abnormal on physical examination. The temperature was 103; the pulse, 100, and respiration, 30. Routine laboratory findings were essentially negative.

The patient remained comatose until death, eight days after admission, the striking clinical feature of the case being the rapid, shallow breathing, particularly during the last three days of life, when the respiratory rate ranged constantly between 40 and 50 a minute. The temperature fluctuated between 100 and 104, and terminally rose to 106. There was some increase in the muscular twitchings, and about half an hour before death there were continuous clonic twitchings of the head and shoulders. The Trousseau and Chvostek signs were not present. Except for marked grayish cyanosis of the face and hands, and the presence of a few coarse râles at the base of the left lung shortly before death, physical examination revealed no changes.

Analyses of the Arterial Blood

Arterial oxygen content	21.29 per cent. by volume
Arterial oxygen capacity	26.8 per cent. by volume
Arterial oxygen saturation	79.6 per cent. by volume
Arterial carbon dioxid content	24.8 per cent. by volume
Arterial carbon dioxid capacity (whole blood)	39.6 per cent. by volume (Equilibrated at 40 mm. CO_2 tension)
Arterial carbon dioxid capacity (serum)	40.9 per cent. by volume (Equilibrated at 40 mm. CO_2 tension)
Arterial blood p_H	7.59

Serum-calcium, 9.8 mg. per hundred cubic centimeters.
Serum-sodium, 304 mg. per hundred cubic centimeters.
Serum-potassium, 16.9 mg. per hundred cubic centimeters.
Serum-chlorid, 3.66 gm. per liter (estimated as Cl_2).

No therapeutic measures were employed other than the intraspinal injection of convalescent serum on the first five days after admission, and a hypodermoclysis of 5 per cent. glucose twelve hours before death.

Blood was drawn from both radial arteries for the foregoing determinations with the usual precautions, avoiding contact with air, approximately an hour before death.

NECROPSY FINDINGS

The specimens obtained at necropsy were kindly examined for us by Dr. Alwin M. Pappenheimer. The cerebral lesions were quite typical of epidemic encephalitis. The extent of the pulmonary lesions was a little difficult to determine from the fixed specimen, but throughout both lungs were patchy, gray areas in which consolidation seemed fairly complete, and which corresponded on section to a loosely purulent exudation in the alveoli. Throughout the less frankly consolidated lung tissue there was extensive edema, congestion and hemorrhage. A very small portion of the lung seemed to be normally aerated. The capillaries were engorged with blood, and there were large areas of hemorrhagic necrosis and edema. The lesions in some respects resembled the lesions of early influenzal pneumonia. It would seem plausible that the function may have been impaired throughout a large area of the lung tissue.

The analyses of the arterial blood thus reveal the presence of an abnormally high p_H associated with a low arterial carbon dioxid content proportionately much lower than the plasma bicarbonate capacity (Van Slyke), which itself is lower than normal. It is evident that the condition is one of "uncompensated carbon dioxid deficit," due to the rapid, shallow breathing, which has produced an abnormally great pulmonary carbon dioxid excretion, with an increase in the ratio $BHCO_3 : H_2CO_3$, and therefore in the p_H.

The condition as regards the increased carbon dioxid excretion, with resulting low carbon dioxid blood content, has been produced experimentally in man by a number of investigators, either by voluntary forced breathing, by breathing air deficient in oxygen, or as a result of the hyperpnea due to immersion in warm water.[1] The clinical symptoms of this type of "alkalosis" have been reported by some of the experimenters as similar to those caused by uncompensated alkali excess (high carbon dioxid, high p_H), namely, tetany. Evidences of tetany were not observed in the present case, in which, however, the blood calcium was normal in amount.

The abnormally low oxygen content of the arterial blood, as a result of rapid, shallow breathing, was first predicted by Haldane, Meakins and Priestley,[2] and has been proposed as the cause of the anoxemia occurring in acute lobar pneumonia.[3] It has also been reported in two cases of epidemic encephalitis by Barach and Woodwell,[4] in which the abnormality of the respiration was apparently similar to that seen in our case. These authors found, however, a very high carbon dioxid content of the arterial blood, and, in one of their cases, a carbon dioxid dissociation curve indicating a p_H of 7.22, which they interpreted as indicating an "uncompensated carbon dioxid acidosis," in other words, exactly the contrary condition. No necropsies were obtained, and the possibility and extent of lung abnormalities, therefore, were not conclusively determined.

The apparent paradox of a low arterial oxygen saturation in a patient whose blood at the same time has a very low carbon dioxid content may be partially explained on the basis of Haldane's theory of the effects of shallow breathing, and possibly furnishes some experimental support for its validity. Haldane has pointed out the fact that for the tensions of oxygen and carbon dioxid which govern the gaseous exchange between blood and air in the lungs, the oxygen and carbon dioxid dissociation curves are quite different, and that diminished respiratory removal of carbon dioxid from the blood in one part of the lungs due to the insufficient expansion of shallow breathing is compensated for by increased removal of carbon dioxid from another part of the blood in another, better ventilated region. In spite of the extreme shallowness of the individual respirations, their large number may make the total respiratory volume normal, or even high, so that an exchange of carbon dioxid in those parts which do expand is highly efficient. The exchange of carbon dioxid in comparison with oxygen is further facilitated by reason of its much more rapid diffusion through the tissues and through the alveolar wall. The researches of the Kroghs[5] on the exchange of gases between blood and alveolar air in the lungs of the rabbit showed that, whereas the oxygen tension of arterial blood is commonly a trifle lower than that of the air with which it has been in contact, equilibrium exists in the case of carbon dioxid. The pulmonary diffusion constant for carbon dioxid (dCO_2) has been calculated by Marie Krogh[6] as 24.6 dCO, and for oxygen it is 1.23 dCO.

We think it is very significant that even when considerable lung abnormality exists, so great is the rate of diffusion of carbon dioxid through the pulmonary tissues that no heaping up in the blood occurs, but that, in fact, the contrary has here taken place. The theory

2. Haldane, J. S.; Meakins, J. C., and Priestley, J. G.: The Effects of Shallow Breathing, J. Physiol. **52**: 433 (May) 1919.
3. Meakins, Jonathan: Harmful Effects of Shallow Breathing with Special Reference to Pneumonia, Arch. Int. Med. **25**: 1 (Jan.) 1920.
4. Barach, A. L., and Woodwell, M. N.: Studies in Oxygen Therapy, III, in an Extreme Type of Shallow Breathing Occurring in Lethargic Encephalitis, Arch. Int. Med. **28**: 421 (Oct.) 1921.
5. Krogh, A., and Krogh, Marie: On the Tensions of Gases in the Arterial Blood, Skand. Arch. f. Physiol. **23**: 179, 1910.
6. Krogh, Marie: The Diffusion of Gases Through the Lungs of Man, J. Physiol. **49**: 271, 1914-1915.

of a "carbon dioxid acidosis" in pneumonia,[7] based on calculations from Hasselbalch's formula, especially when uncorrected for the effect due to the reduced oxygen saturation, requires further investigation by other methods.

In the cases reported by Barach and Woodwell, the administration of a gas mixture containing 80 per cent. of oxygen caused a marked reduction of the arterial oxygen deficiency, and indicates that expansion and proper ventilation must have been going on in a considerable portion of the lungs. It is quite certain that carbon dioxid which diffuses with twenty times the velocity of oxygen $\frac{dCO_2 = 24.6 \ dCO}{dO_2 = 1.23 \ dCO} = 20.0$ must be removed from the blood in those portions of lung tissue with great rapidity and in large amounts.

In its end-result, the condition in our case is comparable to the "alkalosis" which exists during the process of acclimatization to high altitudes. The low arterial carbon dioxid in both cases is due to the "auspumpung," but the production of a low arterial oxygen content is different—in the one case being due to insufficient lung expansion, and in the other, to low atmospheric oxygen tension. The production of an uncompensated carbon dioxid deficit occurs in both, and this, at high altitudes, in turn becomes compensated by the mechanisms which have been studied by Hasselbalch and Lindhard,[8] by Haldane, Kellas and Kennaway,[9] and by others[10] (reduction of urinary ammonia and of titrable acidity, and increased excretion of base). That a similar compensation by a lowering of the blood bases may occur in rapid, shallow breathing is certainly suggested in our case by the distinctly low plasma sodium and potassium. It has not yet been ascertained, but it seems not unlikely, that similar findings will eventually be demonstrated in the blood of persons acclimatized to high altitudes.

Owing to the probable cause of the respiratory abnormality—a pathologic lesion in the respiratory center— our study affords no suggestions of value for therapy. The administration of oxygen in the cases reported by Barach and Woodwell had no influence on the ultimate outcome. Alkali therapy, however, which might be suggested by reason of the low plasma bicarbonate, would be contraindicated, although the breathing of air mixtures containing carbon dioxid might conceivably be useful.

Seventieth Street and Madison Avenue.

7. Means, J. H.; Bock, A. V., and Woodwell, M. N.: Studies of the Acid-Base Equilibrium in Disease from the Point of View of Blood Gases, J. Exper. Med. **33**: 201 (Feb.) 1921. Barach, A. L.; Means, J. H., and Woodwell, M. N.: The Hydrogen Ion Concentration and Bicarbonate Level of the Blood in Pneumonia, J. Biol. Chem. **50**: 413 (Feb.) 1922.

8. Hasselbalch, K. A., and Lindhard, J.: Zur experimentellen physiologie des Höhenklimas II, Biochem. Ztschr. **68**: 265, 1915.

9 Haldane, J. S.; Kellas, A. M., and Kennaway, E. L.: Experiments on Acclimatization to Reduced Atmospheric Pressure, J. Physiol. **53**: 181 (Dec.) 1919.

10. Barcroft, J., et al.: Report of the Royal Society's Expedition to Peru, London, 1922.

Agglutinin Reaction.—The establishment of the agglutinin reaction as a constant and specific serum-phenomenon by the work of Gruber and Durham led immediately to assiduous investigation of the many problems suggested by it, and among them, the question of the nature of the agglutinogen. It was found that agglutinins could be produced, not only by the injection of whole bacteria, but equally well by treatment with dissolved bacterial extracts or with filtrates from old broth cultures. This naturally led to the thought that there might be a definite reaction if such extracts were added to agglutinating serums in vitro. Rudolf Kraus was the first to perform this very logical experiment.—Zinnser: Infection and Resistance, the Macmillan Company, 1923.

VALUE OF CARBON TETRACHLORID AS AN ANTHELMINTIC*

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From a published report on the use of carbon tetrachlorid as an anthelmintic in the treatment of ancylostomiasis one is led to conclude that as such it is more efficacious than any of the other three drugs in general use in hookworm campaigns. In this report an attempt has been made to make a comparative estimate of the value of the four vermifuges thymol, betanaphthol, chenopodium and carbon tetrachlorid, definite fixed doses of each being used.

An absolute control of persons under treatment was necessary. Three hundred prisoners in two of the island jails were selected with their own consent and with the permission and assistance of the superintendent of prisons; of these, 215 completed the prescribed course of treatment, the remainder falling out on account of discharge, illness and personal objections. The men selected were those who had been exposed to hookworm infection previous to imprisonment and who had been in custody for from three months to three years, though in a few cases this did not apply. The reason for this was to exclude, so far as it is possible, chances of recent infection, with consequent appearance of hookworms in the intestine during the course of treatment. All hookworms expelled by these prisoners were of the species *Necator americanus*.

The general system of treatment was as follows:

1. No food of any kind on the morning of treatment.
2. A. (*a*) Thymol, 20 grains, at 7 a. m.
   (*b*) Thymol, 20 grains, at 9 a. m.
   (*c*) Saturated Epsom salt, 2 ounces, at 11 a. m.
   (*d*) Treatment interval, seven days.
   B. (*a*) Chenopodium, 12 minims, at 7 a. m., in water.
   (*b*) Chenopodium, 12 minims, at 9 a. m., in water.
   (*c*) Saturated Epsom salt, 2 ounces, at 11 a. m.
   (*d*) Treatment interval, seven days.
   C. (*a*) Betanaphthol, 40 grains, at 8 a. m.
   (*b*) Saturated Epsom salt, 2 ounces, at 11 a. m.
   (*c*) Treatment interval, seven days.
   D. (*a*) Carbon tetrachlorid, 3 c.c., in water, at 8 a. m.
   (*b*) Saturated Epsom salt, 2 ounces, at 11 a. m.
   (*c*) Treatment interval, fourteen days.

The prisoners were divided into four equal groups: A, B, C and D.

Group A received three complete treatments with thymol, and one week later twenty-five received a fourth treatment with chenopodium, twenty-five with carbon tetrachlorid and twenty-five with betanaphthol.

Group B received three complete treatments with chenopodium, and one week later twenty-five received a fourth treatment with thymol, twenty-five with betanaphthol and twenty-five with carbon tetrachlorid.

Group C received three complete treatments with betanaphthol and one week later twenty-five received a fourth treatment with thymol, twenty-five with chenopodium and twenty-five with carbon tetrachlorid.

Group D received two complete treatments with carbon tetrachlorid, and one week later twenty-five received a third treatment with thymol, twenty-five with chenopodium and twenty-five with betanaphthol.

* The studies and observations on which this paper is based were conducted with the support and under the auspices of the International Health Board of the Rockefeller Foundation.

The results of the worm counts are given in Table 1; of these, more than 75 per cent. were made either by me or in my presence, the remainder being entrusted to a senior medical officer whose work and reports have always been most reliable. When I did not give the treatments they were given by my assistant.

TABLE 1.—*Results of Worm Counts*

Group A—Thymol

Number Treated	First Count	Second Count	Third Count	Drugs Used in Fourth Treatment	Fourth Count
16	302	67	24	Carbon tetrachlorid.....	23
15	483	69	6	Chenopodium.....	6
13	605	40	12	Betanaphthol.....	13
44	1,390	176	42		42

I. Cures:
1. Nine by one treatment
2. Eleven by two treatments
3. Eleven by three treatments

II. Worms removed:
1. 84.2 per cent. by one treatment
2. 94.9 per cent. by two treatments
3. 97.4 per cent. by three treatments
4. Total worms removed, three treatments, 1,608
5. Average worms removed per person, 36

Group B—Chenopodium

Number Treated	First Count	Second Count	Third Count	Drugs Used in Fourth Treatment	Fourth Count
18	684	190	40	Thymol.....	27
15	509	110	13	Betanaphthol.....	21
18	1,014	35	13	Carbon tetrachlorid.....	29
51	2,207	335	66		77

I. Cures:
1. Fourteen being cured by one treatment
2. Nine being cured by two treatments
3. Eleven being cured by three treatments

II. Worms removed:
1. 81.4 per cent. by one treatment
2. 94.6 per cent. by two treatments
3. 97.1 per cent. by three treatments
4. Total worms removed, three treatments, 2,608
5. Average worms removed per person, 51

Group C—Betanaphthol

Number Treated	First Count	Second Count	Third Count	Drugs Used in Fourth Treatment	Fourth Count
16	798	18	5	Chenopodium.....	0
18	1,151	35	23	Thymol.....	3
19	1,171	118	53	Carbon tetrachlorid.....	4
53	3,120	171	81		10

I. Cures:
1. Twenty-one by one treatment
2. Fifteen by two treatments
3. Eleven by three treatments

II. Worms removed:
1. 92.2 per cent. by one treatment
2. 97.3 per cent. by two treatments
3. 99.7 per cent. by three treatments
4. Total worms removed, three treatments, 3,372
5. Average worms removed per person, 63

Group D—Carbon Tetrachlorid

Number Treated	First Count	Second Count	Drugs Used in Third Treatment	Third Count
31	3,090	40	Chenopodium.....	2
17	867	22	Thymol.....	5
19	1,643	12	Betanaphthol.....	13
67	5,600	74		20

I. Cures:
1. Thirty-nine by one treatment
2. Seventeen by two treatments

II. Worms removed:
1. 98.3 per cent. by one treatment
2. 99.6 per cent. by two treatments
3. Total worms removed, two treatments, 5,674
4. Average worms removed per person, 85

Having demonstrated that carbon tetrachlorid is the most efficient anthelmintic in the doses named, we must compare the drug with itself, using the total number of worms removed by two doses as the basis of comparison (Table 3).

From Table 3 it is quite evident that the anthelmintic value of carbon tetrachlorid is practically unaltered by differences in the number of worms harbored, whereas with chenopodium the relative efficiency rises as the worm count increases.

Another point well demonstrated is the apparent futility of prolonged treatment, since in those cases in which the total number of hookworms removed by a complete treatment was 50 or over, 98.9 per cent. were removed by one dose of carbon tetrachlorid, and 96.8, 99.4 and 97.7 per cent. by two of chenopodium, thymol and betanaphthol, respectively. However, it is not intended to depreciate the value of second or third treatments, since they are advisable when successful control measures are being enforced. But when reinfection does occur with any degree of rapidity, they appear to be of doubtful value.

In order to decide whether or not a 3 c.c. dose of carbon tetrachlorid produces any lesion of the kidney, careful observations were made on Prisoners 140 to

TABLE 2.—*Comparison of the Results*

Summary I.—Percentage Comparison of Worms Removed

Drugs Used	First Treatment	Second Treatment	Third Treatment
Chenopodium.....	81.3	94.5	97.2
Thymol.....	84.2	94.9	97.4
Betanaphthol.....	93.0	97.9	99.8
Carbon tetrachlorid.....	97.9	99.6	

Summary II.—Percentage Comparison of Apparent Cures

Drugs Used	First Treatment	Second Treatment	Third Treatment
Thymol.....	25.0	55.5	86.1
Chenopodium.....	35.9	58.9	87.2
Betanaphthol.....	39.6	67.9	88.7
Carbon tetrachlorid.....	58.2	83.6	

TABLE 3.—*Results with Carbon Tetrachlorid and with Chenopodium*

Worms Removed by Complete Treatment	Carbon Tetrachlorid: Percentage Removed by First Treatment	Chenopodium: Percentage Removed by First Treatment	Chenopodium: Percentage by First Two Treatments
10 and under.....	98.2	83.7	94.6
10 to 25.....	98.2	91.8	95.8
25 to 50.....	97.2	71.1	93.6
50 to 100.....	98.5	82.8	98.9
100 to 200.....	99.3	—	—
200 or over.....	99.0	87.3	98.1

179, inclusive. The blood pressure of each prisoner was taken previous to, immediately after, and four hours after treatment, and in no case was any change recorded, while urinalyses of specimens collected before, one hour, twenty-four hours and seventy-two hours subsequent to treatment in the sixty-seven cases treated showed no evidence of kidney injury, thus indicating that 3 c.c. of this vermifuge is not harmful to that organ.

CONCLUSIONS

1. In the dosage employed and by the method of comparison used, carbon tetrachlorid proves to be the most efficient of the four vermifuges, both in percentage of cures and in percentage of worms removed per treatment.

2. After a dose of 3 c.c. of carbon tetrachlorid, followed by a saline cathartic, there were no clinical evidences of renal injury, and the drug appears to be a safe and efficient anthelmintic in the dose used.

3. Carbon tetrachlorid appears to remove as high a percentage of the total worms harbored when the number is small as when it is large.

SOME CHEMICAL BLOOD CHANGES IN CHRONIC ALCOHOLISM *

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AND
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LOS ANGELES

The effects of alcohol on the organism have for a long time been a matter of pathologic and anatomic study. Comparatively little work has been done on the chemical changes that occur. The early chemical changes are the stepping stones to the gross changes in the brain and other tissues that are recognized as the result of chronic alcoholism. Many problems concerning alcoholism must therefore be solved by chemical studies.

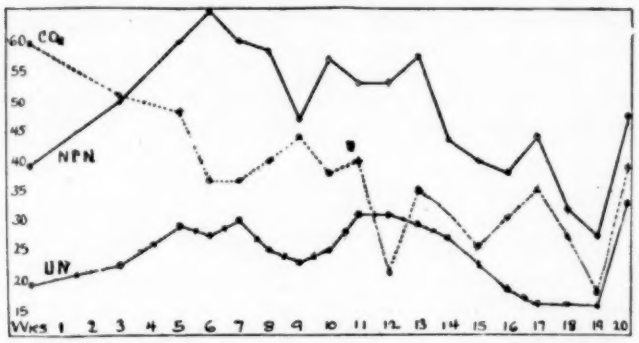

Chart 1.—Findings in Experiment 8. In the charts, the solid line indicates nonprotein nitrogen, and the crossed line the urea nitrogen, in milligrams per hundred cubic centimeters of blood; the broken line indicates percentage by volume of carbon dioxid.

Of the marked pathologic changes in chronic alcoholism, especially in the instances in which delirium tremens supervenes, a gross edema in the brain is often noted. In addition to the edema of the meninges, the brain tissue of persons dying of delirium tremens has been found to have a markedly increased hydration capacity.[1] The explanation of this phenomenon was thought to be an acidosis. As a further substantiation of this, the brain substance of persons dying of uremia, a condition in which acidosis was known to exist, was found to have an increased hydration capacity. Likewise, the brains of persons dying from morphin poisoning or from cerebral thrombosis took up increased amounts of water. In these conditions it was assumed that the narcosis resulting from the morphin poisoning or from the cell asphyxia incident to the disturbed circulation in cerebral thrombosis resulted in an acidosis. These explanations of cerebral edema were corroborated in some measure by animal experimentation.[2]

Since most of the work on chronic alcoholism was done before the advent of accurate blood chemical methods, little is known of the histochemical changes that occur. These chemical changes are not unlikely the key to unsolved problems in this field.

We have continued the study of chronic alcoholism, being especially concerned with the question of acidosis and with the changes of the nonprotein nitrogen and urea nitrogen of the blood.

Regardless of what may be said concerning the efficacy of prohibition, the occurrence of delirium tremens has been very materially reduced, so that our present study has of necessity been confined to experimental animals. Rabbits (weighing 4 pounds) were used for the reason that they withstand the continued administration of alcohol well and develop an easily recognized chronic alcoholism, as described by Friedenwald.[3]

A phenolsulphonephthalein determination was made on each animal at the beginning of the experiment, and again at the end of the experiment. The urines were carefully studied so as to exclude spontaneous nephritis. The nonprotein nitrogen and urea nitrogen of the blood were determined by the methods of Folin and Wu.[4] The carbon dioxid of the blood was determined by the Van Slyke and Cullen[5] technic and was frequently checked by the R p_H method of Marriott.[6]

Ten c.c. of 95 per cent. alcohol in 50 c.c. of water was given each morning by stomach tube. Deep narcosis resulted regularly within a half hour, and continued for from two to four hours. Every seventh day before the morning feeding, which consisted of a mixed diet of cabbage leaves, barley and alfalfa hay, the animal was bled from the ear vein, and the nonprotein nitrogen, the urea nitrogen and the carbon dioxid of the blood determined.

A rest of from one to three days was occasionally given an animal that would otherwise have died shortly from chronic alcoholism. Such a rest allowed the animal to regain his equilibrium and to continue the taking of alcohol for a much longer time.

Chart 2.—Findings in Experiment 3.

RESULTS

Following a single large dose of alcohol (20 c.c. of 95 per cent. alcohol diluted with 50 c.c. of water), a profound narcosis developed within thirty minutes, and continued for many hours. The blood taken twelve hours from the time of administering the alcohol showed little or no change in the nonprotein nitrogen

* From the laboratories of the Santa Barbara Cottage Hospital.

* Read before the Section on Pathology and Physiology at the Seventy-Fourth Annual Session of the American Medical Association, San Francisco, June, 1923.

1. Nuzum, F. R., and Le Count, E. R.: The Ability of Brain Tissue to Take up Water in Delirium Tremens and Other Conditions: A Study of Cerebral Edema, J. A. M. A. **67**: 1822 (Dec. 16) 1916.

2. Rabbits were given daily intoxicating doses of alcohol for periods varying from two to four months. Chronic alcoholism resulted. While at necropsy gross edema was not observed in any of these rabbits, the brain substance had a hydration capacity much in excess of the normal control brains, and an even greater hydration capacity than that of human brains from persons dying of delirium tremens.

3. Friedenwald, Julius: The Pathologic Effects of Alcohol on Rabbits, J. A. M. A. **45**: 780 (Sept. 9) 1905.

4. Folin, Otto, and Wu, Hsien: A System of Blood Analysis, J. Biol. Chem. **38**: 81 (May) 1919.

5. Van Slyke, D. D., and Cullen, G. E.: The Bicarbonate Concentration of the Blood Plasma: Its Significance and Its Determination as a Measure of Acidosis, J. Biol. Chem. **30**: 289 (June) 1917.

6. Marriott, W. M.: A Method for the Determination of the Alkali Reserve of the Blood Plasma, Arch. Int. Med. **17**: 840 (June) 1916.

or the urea nitrogen content. However, a sharp drop in the readings of the carbon dioxid in the blood serum by the Van Slyke method and in the R p_H (Marriott method) occurred. The carbon dioxid varied in these instances from 29.2 to 37 degrees, and the R p_H varied from 8.1 to 8.3. These rabbits recovered promptly.

The animals that received daily intoxicating doses of alcohol (10 c.c. diluted with 50 c.c. of water) showed a marked variation in their ability to withstand continued drunkenness. Many died from intercurrent infections during the early weeks of the experiment. Of twenty-four animals that were used, four developed

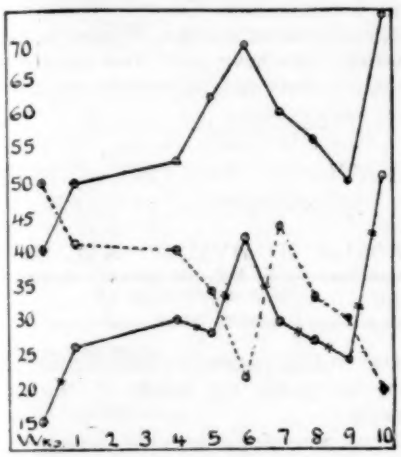

Chart 3.—Findings in experiment with Animal 19.

symptoms of chronic alcoholism and lived from two and one-half to five and one-half months. The changes in the nonprotein nitrogen and urea nitrogen in the blood and the variations in the carbon dioxid have been charted. A study of these charts demonstrates graphically the variations from normal.

Chart 1 illustrates the findings in Experiment 8, this rabbit having received daily intoxicating doses of alcohol for twenty weeks. The carbon dioxid at the beginning of the experiment was 60 degrees. Throughout the entire experiment it was continually lower than this, ranging roughly between 40 and 19 degrees. The nonprotein nitrogen, which at the beginning of the experiment was 40 mg. per hundred cubic centimeters of blood, ranged almost continually higher thereafter. The maximum reading was 65 mg. per hundred cubic centimeters of blood on the sixth week. On the eighteenth and nineteenth weeks it reached lower figures, 34 to 27.5, respectively. It rose on the twentieth, or final week, of the experiment to 47.5 mg. The urea nitrogen at the outset was 19 mg. per hundred cubic centimeters of blood. These readings likewise became higher, making this curve fairly comparable with that of the nonprotein nitrogen. During the sixteenth to nineteenth weeks of the experiment, the readings were lower than at the outset, varying from 18.5 to 16 mg. During the final week of the experiment, the urea nitrogen became abruptly higher, reading 33 mg. At this time (the twentieth week), the animal exhibited the symptoms characteristic of an advanced chronic alcoholism. A final specimen of urine was collected, which was negative, both chemically and microscopically. A two hour phenolsulphonephthalein determination at the beginning of the experiment gave a reading of 74 degrees. A similar test at the conclusion of the experiment gave a reading of 82.5 degrees.

At necropsy, the various organs of the body were grossly negative. Serial microscopic sections of the kidneys demonstrated small scattered areas in the cortex in which the cells lining the convoluted tubules appeared swollen. No changes were noted in the glomerula. There was no increase of fibrous connective tissue throughout the cortex. These kidneys approximated the normal very closely.

Chart 2 illustrates the findings in Experiment 3, which ran for twenty-three weeks. This was the longest in duration of any of our experiments. The carbon dioxid of the blood serum, before the feeding of alcohol began, was 45 degrees. An extreme acidosis was not found at any time, the lowest reading recorded being 36 degrees on the fifteenth week. During the nineteenth to twenty-second weeks, the readings were above normal, varying from 46 to 58 degrees. The nonprotein nitrogen and the urea nitrogen of the blood were almost continually higher than normal throughout the experiment, the only exception being a period during the nineteenth to twenty-second weeks. At this time acidosis was not present, the carbon dioxid being at normal or above. The two hour phenolsulphonephthalein output at the outset was 80 per cent. Just before death it was 76 per cent.

At necropsy, all of the organs were grossly negative. Histologically, the kidneys presented large areas of round cell infiltration scattered through the cortex and medulla. There was an apparent vacuolization and a lessened height of the cells lining the convoluted tubules. There was an increase in the fibrous tissue about some of the tubules and vessels in the medullary rays. This increase was most marked about the corticomedullary junction. These kidneys present a moderate chronic change.

Chart 3 (Animal 19) is an excellent illustration of a marked degree of acidosis throughout the experiment, and at the same time a marked increase in both the nonprotein nitrogen and the urea nitrogen of the blood. The carbon dioxid at the outset was 50 degrees. During the ten weeks of the experiment it ranged between 40 and 19 degrees. At the tenth week the nonprotein nitrogen was 74 mg., and the urea nitrogen 51 mg. per hundred cubic centimeters of blood, respectively. This animal did not recover from his final dose of alcohol. No final phenolsulphonephthalein reading was obtained.

At necropsy, no gross change in the viscera of the thorax or abdomen was noted. Microscopic sections of the kidneys revealed that the vessels in the medullary rays were noticeably engorged. The endothelial cells lining the capillaries were distinct, but presented no changes. There were no areas of round cell infiltration. There was no increase of fibrous connective tissue.

The cytoplasm of the cells lining the convoluted tubules was finely granular. In some of these cells were rounded hyaline bodies, which were apparently formed within the cell and were then gradually extruded into the lumen of the tubules.

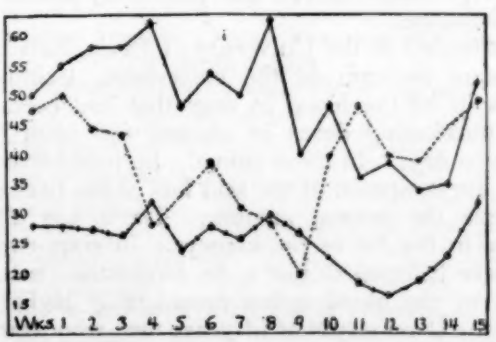

Chart 4.—Findings in Experiment 11.

The smaller granules were probably Altman's. The larger were the hyaline bodies described by Volhardt and Fahr.

Chart 4 (Experiment 11) illustrates the pronounced acidosis that was present throughout the experiment, which lasted fifteen weeks. The lowest reading of the carbon dioxid was 21 degrees on the ninth week. From the eleventh week to the fifteenth, or final, week inclusive, the carbon dioxid became higher, ranging from 40 to 49 degrees. The curves of the nonprotein nitrogen and the urea nitrogen were fairly comparable. The maximum figure of 63 mg. of nonprotein nitrogen was reached on the eighth week. The maximum figure for the urea nitrogen was 32.2 mg. on the fifteenth, or final, week. The phenolsulphonephthalein elimination at the beginning of this experiment was 80 degrees for the two hours. At the conclusion of the experiment it was 74 degrees.

This experiment was characteristic of a certain group of animals that react sharply during the early weeks of the intoxication. They then establish a tolerance to the alcohol, as indicated by a lessening of the degree of acidosis, and an approach toward the normal of the nonprotein nitrogen and urea nitrogen of the blood.

At necropsy, no gross changes were noted in the organs of the trunk. On section, the kidneys presented small areas of round cell infiltration scattered through the cortex. There were no changes in the cells lining the glomerular capillaries, or in the cells lining the vessels in the medullary rays. The cells lining the convoluted tubules presented no alteration of their nuclei or cytoplasm.

COMMENT

A definite acidosis was constantly present in those animals in which chronic alcoholism developed. At the same time there was an increase in the nonprotein nitrogen and urea nitrogen of the blood. This increase averaged approximately twice the normal amount of these substances. Animals that developed a marked acidosis at the outset of the experiment, and which continued, developed chronic alcoholism more quickly and often died much more quickly than animals in which the acidosis was not so marked. The latter group, as represented by Chart 3, evidently had a greater tolerance for the alcohol intoxication, and the experiment could be carried on for a considerably longer time. The acidosis may have interfered to some extent with the ability of the kidney to excrete the nonprotein nitrogen and the urea nitrogen, or, as a result of a continued feeding of alcohol, the metabolism of the animal may have been so altered as to cause an increased amount of these substances in the blood. From our studies we are not able to state the exact mechanism.

The histologic study of the kidneys demonstrated little deviation from the normal. The one instance in which moderate chronic changes were noted might have been an example of spontaneous chronic nephritis, a condition frequently observed in rabbits. The phenolsulphonephthalein output was practically unaltered in every instance.

Duccheschi,[7] of the University of Pavia, Italy, found a constant increase in the cholesterin, lecithin and fatty acids of the blood in dogs that had been given daily intoxicating doses of alcohol for from ten to thirty-two days. In these animals, he found that there was an augmentation of the acid fats of the liver reaching triple the normal amount. There was also an increase in the fat in the kidneys. In sixty-two men who were habitual drinkers, he found the cholesterin content of the blood serum considerably higher than that of the blood serum of fifty-five men who were total abstainers. He concluded that these cellular lipoids represented the first phase of the chemical processes in the long course of which gross pathologic changes resulted.

Our studies reveal a change in the nonprotein nitrogen and the urea nitrogen of the blood and in the acid-base balance, and it is not unlikely that other constituents not yet considered are also altered. It would seem, however, that the factor of acidosis is especially important in cases both of acute and of chronic alcoholism, and it must have an important etiologic rôle in the gross tisue changes and in the edema of delirium tremens.

7. Duccheschi, B.: Researches Relative to the Action of Ethyl Alcohol on the Organism, Arch. Ital. Biol. **70**: 93, 1920.

ABSTRACT OF DISCUSSION

DR. MONTROSE T. BURROWS, St. Louis: I should like to ask Dr. Nuzum whether he has found any evidences of any toxic substances in the blood of alcoholics. I was interested after developing a rather sensitive method for determining toxic substances in the blood to notice that the blood of persons suffering from acute alcoholism, like the blood of those in the acute stages of pneumonia, contains substances that destroy cells. This destruction of cells seems to indicate the presence of true toxic substances in the blood of these patients. The changes are more than occur from the acidosis described by Dr. Nuzum.

DR. C. W. GREENE, Columbia, Mo.: May I ask Dr. Nuzum whether he made any oxygen determinations along with his carbon dioxid determination.

DR. F. R. NUZUM, Santa Barbara, Calif.: In answer to Dr. Greene's question: We have not. And answering Dr. Burrows' question, We have not determined any poison.

OBSERVATIONS IN ONE THOUSAND NEUROLOGIC CASES

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NEW YORK

My purpose in this paper is to offer a brief statistical analysis and to touch on some of the features of general interest.

The Bellevue neurologic service, which is under the control of the Cornell Medical School, is distinct from the psychiatric service, and has, at present, two wards, each of twelve beds, for men and women patients. There are two interns, a resident in charge, and an assistant. In addition to the charge of their own wards, the interns are on call for consultation work throughout the hospital.

The members of the visiting staff see all patients in the neurologic wards, and most of those examined in consultation in other services. An adequate physiotherapy department is available. The social service department gives its usual aid and, in addition, supplies occupational therapy instructors.

From other wards in the hospital are selected the majority of patients cared for in the neurologic service. During 1921, 300 patients were treated in the ward, and the duration of treatment for each patient averaged twenty-five days. Eight hundred and sixty-two patients were examined in other wards, and many of these were seen several times by the interns. In addition to the hospital patients, several hundred persons were referred from outside the hospital for neurologic examination. These are not included in this report.

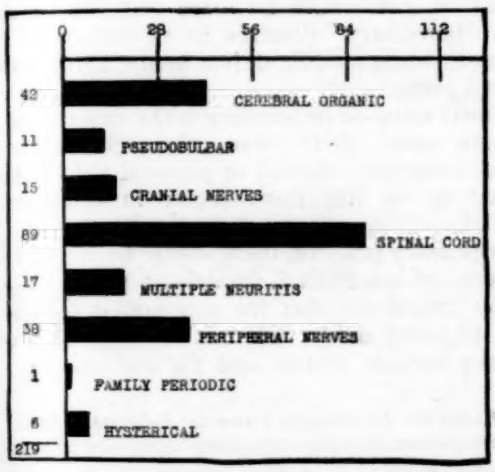
There were approximately 43,000 admissions to Bellevue Hospital in 1921, and the neurologic service was not called into consultation in the majority of certain conditions in which neurologic diagnosis could be made without the help of the neurologic service. Only the minority of paralysis agitans, tabes dorsalis, cerebrospinal syphilis, apoplexy, old hemiplegia (the result of normal apoplexy), epidemic poliomyelitis and hysteria cases were seen by the neurologic service. Two hundred and forty-three fractured skull cases were admitted to the hospital during the year, and the neurologic service was called into consultation in only seventy of these cases.

A small number of psychiatric patients and a similar number of psychoneurotic patients were admitted to the neurologic service.

In the 1,003 patients examined or treated by the neurologic service, 120 different disease conditions were seen. In some patients, the diagnosis included more than one condition—for example, one patient had pseudobulbar palsy on a syphilitic basis; he was admitted to the hospital with a fractured femur, and, as a result of his injury, had an hysterical paralysis of the affected leg. Intercurrent non-neurologic conditions occasionally appeared while a patient was under care in the neurologic ward. For example, one choreic patient developed acute appendicitis. These non-neurologic conditions were not included in the 120 different disease conditions seen.

In Table 1 there are thirteen conditions, each of which was represented by over twenty cases. The total number of cases in this group is 649, or approximately 65 per cent. of all patients seen during the year.

Eliminating skull injuries, constitutional psychoses and psychoneuroses, constitutional inferiority and mental defects (a total of 216 cases), we have 787 cases of organic nervous disease. Seventeen different conditions were represented by a total of 513 cases, about



Types of paralysis seen in the neurologic service: "cerebral organic" includes tumor, head injury and vascular accident; "spinal cord" includes Friedreich's ataxia and multiple sclerosis.

66 per cent. of all instances of organic involvement of the nervous system.

The accompanying chart classifies the anatomic distribution of the various forms of paralysis observed. In family periodic paralysis, the neural mechanism of the paralysis is not known, but the complete blocking of the motor neuron functions suggests a process akin to that seen in curare poisoning, and the analogy may warrant one in suspecting that the motor end plates are involved.

Hysterical paralysis is included in the chart to show its relative rarity, and because a correct diagnosis of hysterical paralysis is of the utmost importance. Several of the six cases seen had previously been regarded as of organic nature. One exception to this was interesting. A man, aged about 30, was stabbed in the back of the neck. The force of the blow knocked him down. He was unable to get up. The ambulance surgeon found a hemiplegia, and diagnosed it as hysterical. The patient was taken to the hospital, and the admitting staff spent two hours trying to make the patient get up and walk. A careful examination showed a hemisection of the cord at the fifth cervical segment.

Table 3 might itself be the subject for an extensive bit of research, but it is included in this paper without comment because it shows the frequency of definite clinical conditions which, in their association with convulsions, might reasonably be regarded as causally connected. In a large proportion of the patients having generalized seizures, detailed histories showed that early in the course of the disease many attacks were atypical and of the sort described by Gowers.[1]

TABLE 1.—*Common Conditions in Order of Frequency*

	Seen by the Neurologic Service	Number of Cases Admitted to Bellevue Hospital
Syphilis	117	673*
Fracture of the skull	70	243
Miscellaneous paralyses	69	156
Epilepsy	60	375
Psychoneuroses	59	218†
Psychoses	47	
Epidemic encephalitis	44	
Neuritis of single nerves	38	
Vascular accidents	34	197
Transverse myelitis	33	
Tumors of the brain	31	
Tuberculosis of the central nervous system	24	
Multiple sclerosis	23	
Acute epidemic poliomyelitis	17	
Multiple neuritis	17	
Concussion of the brain	15	
Tumors of the cord	15	
Cerebrospinal meningitis	14	
Constitutional inferiority	14	
Combined sclerosis	13	
Paralysis agitans	12	
General arteriosclerosis	11	
Mental defectives	11	
Brain abscess	10	
Total	798	

* Includes primary, secondary and tertiary, but not tabes or paresis.
† Only hysteria; others not grouped under this heading.

The sixty cases enumerated in Sections A and B of Table 3 were referred to the neurologic service as "idiopathic epilepsy." After a study of these patients, there were but one third in whom it was impossible to establish either anatomic or physiologic facts which gave us some sort of understanding of the cases. These residual twenty patients, therefore, still had to be regarded as having "idiopathic epilepsy."

In Section C, the seizures were known to be symptomatic at the time of the first examination.

TABLE 2.—*Most Frequent Organic Conditions Affecting the Nervous System*

Syphilis	117
Epilepsy	60
Epidemic encephalitis	44
Single neuritis	38
Vascular accident (cerebral)	34
Transverse myelitis	33
Tumors of the brain	31
Tuberculosis of central nervous system	24
Multiple sclerosis	23
Acute epidemic poliomyelitis	17
Multiple neuritis	17
Tumors of the cord	15
Cerebrospinal meningitis, except that of tuberculous origin	14
Combined sclerosis	13
Paralysis agitans	12
General arteriosclerosis	11
Brain abscess	10
Total	513

In Table 4, the classifications are in accordance with the Bellevue nomenclature, and do not permit of more detailed analysis of diagnosis or knowledge of etiology or location of the pathologic changes in the central nervous system. Clear psychiatric cases are not included in this table.

During 1921, there were admitted to Bellevue Hospital 38,438 patients with medical conditions. Section 1 of this table enumerates the neurologic conditions.

1. Gowers: The Borderland of Epilepsy.

The classification is a rather rough one, and it is quite possible that there were included under different headings a great many patients in whom there were neurologic complications. For instance, there were three lobar pneumonia patients who died as the result of metastatic cerebral abscesses. It would be an enormous task to go through all the records to determine the relative proportion of admissions in which there was either an organic or a functional nervous disease, as either a complication of or a concomitant of a medical condition. The enumeration in Section 1 gives a total of 2,851 cases of conditions in which a neurologic examination would be indicated. Of the 673 syphilitic patients, those in the primary stage would not really need a neurologic examination. There were, roughly, about 150 such cases, but it is difficult to decide where the primary stage ends and the secondary stage begins, and perhaps it is not unjustifiable to maintain that a neurologic examination is desirable for every syphilitic patient. These 2,851 cases represent about 7.4 per cent. of all medical admissions to Bellevue Hospital.

TABLE 3.—*Epileptic Convulsions*

A. Jacksonian:	
1. With brain tumor	3
2. With tuberculosis of brain	1
3. Posttyphoid	1
4. Arteriosclerotic	1
5. Syphilis	1
B. General:	
1. "Idiopathic"	20
2. With constitutional inferiority or epileptic personality	9
3. Posttraumatic	4
4. Syphilis	3
5. Status epilepticus	3*
6. Hystero-epilepsy	3
7. Due to ear disease	2
8. Sensory epilepsy	2†
9. Pachymeningitis	2
10. Vasovagal attacks	2
11. Static (cerebellar)	1
12. Alcohol	1
13. Gastro-intestinal	1
C. Seizures occurring in thirty-one brain tumors:	
1. Jacksonian	9
2. Generalized	4

* All three cases were "idiopathic" epilepsies.
† Trauma to occiput and osteoma of skull.

The surgical services admitted about 4,500 traumatic cases in 1921. Fractures of the skull and spine totaled 262, or about 5.8 per cent. of traumatic cases. In order to ascertain the number of cases of concussion of the brain or spinal cord, it would be necessary to search the case records. It is possible, then, that in 10 per cent. of traumatic cases there should be a neurologic examination.

Of the total admissions to Bellevue Hospital, which were about 43,000 cases, in approximately 3,113 cases, or about 7 per cent, there should have been a neurologic examination.

One's first impression might be that in private practice less than 7 per cent. of patients are neurologic cases. But the Cornell Clinic in its past year admitted over 22,000 patients, and the neurologic department examined a little over 7 per cent. of all these. So it seems reasonable to say that this proportion holds true in general practice, which would include both ambulatory and confined patients.

Consultation with the neurologic service was requested for about 875 patients. Of the total of 1,003 patients cared for or examined by the neurologic service, about 13 per cent. were admitted to the ward from outside sources. Thus, as at present organized, the neurologic service took care of about 28 per cent. of the neurologic cases in the hospital. It is not implied that the other services in the hospital were dependent on the neurologic service for either diagnosis or treatment of many of the neurologic cases. But from an ideal standpoint, the neurologic service should be able to take care of every case falling within its scope. Furthermore, other services in the hospital should realize, both for the sake of science and for the sake of the patient, that a neurologic survey should be given whenever indicated.

To perform this ideal function, the Bellevue Hospital neurologic service should have wards with three times the present capacity.

In Table 5, several points are of interest. In the first place, it is rare to find a patient with so-called hereditary disease in which there seems to be any hereditary factor.

In the only instances in which so-called hereditary disease occurred in other members of the family, the disease was present in siblings. It is not intended to assert that there is no such thing as hereditary disease, but it seems likely that "hereditary" nervous diseases are no more hereditary than "hereditary" cancer or tuberculosis. It would be more accurate to classify certain "hereditary" diseases as of embryonic origin and due to some specific defect in the germ plasm, of unknown cause.

The next thing of importance is the fact that in 1,003 neurologic cases, there were only eighty-seven cases in which congenital mental or physical defect could be regarded as an important factor in the conditions presented.

In dispensary practice, there would be found a larger proportion of congenital mental or physical defects. It is my impression that the commonest sort of congenital physical defect lies in an instability of the vegetative nervous system and the endocrines.

TABLE 4.—*Neurologic Cases in Bellevue in 1921*

1. Medical service:		
1. Syphilis		673*
2. Tabes dorsalis		95
3. Epilepsy		375
4. Hysteria		218
5. Acute apoplexies		197
6. Paralyses of ill defined origin		156†
7. Neuralgia and neuritis		122
8. Chorea		112
9. Acute encephalitis		104
10. Exophthalmic goiter		59
11. Tuberculous meningitis		29
12. Simple meningitis		27
13. Other diseases of the spinal cord		167
14. Other diseases of the nervous system		517‡
Total		2,851
2. Surgical service:		
1. Fracture of skull	243	(160 cured or improved; 83 died)
2. Fracture of spine	19	(14 cured or improved; 5 died)
Total	262	

* Includes primary, secondary and tertiary syphilis but not paresis or tabes.
† Includes residual hemiplegias.
‡ Infections, traumas, vascular, tumors, psychoneuroses, etc.

Conditions in which the causes are unknown totaled 144 cases, or about 14 per cent. of all the patients. This group of conditions should be subject to investigation.

Eliminating the cases in which congenital defects were the chief causes, and cases in which the etiology is unknown—a total of 23 per cent. of all patients—we come to the cases in which causal conditions are to some extent under medical control. The proportionate frequency of the various causes in this group suggests

what things should be emphasized in teaching medical students. Clinical rarities and obscure problems in neurophysiology and neuro-anatomy seize the attention of the average instructor. But when one finds that 7 per cent. of all medical cases are neurologic, and that three fourths of the neurologic cases are linked with common medical problems, it seems wise to insist that in teaching neurology to undergraduates the instructors curb their enthusiasm for problems that should be of interest to neurologists only.

As might be expected, the brain is most subject to insult. These insults range from psychic, through infections, toxins, vascular accidents and tumors, down to physical trauma. The vegetative nervous system and endocrines have received a great deal of attention in the last decade. Their derangements are relatively of minor importance in patients seen by the Bellevue neurologic service, in that only seventy-three cases, or 7 per cent., presented diseases of these systems. However, the reverse is true in dispensary practice. I have no accurate figures available, but it is my impression that at least one third of dispensary neurologic patients

TABLE 5.—*Chief Causes of Conditions Found in Patients*

	Directly or Immediately Affecting the Central Nervous System	Resulting in Nervous System Complications
1. Hereditary:		
Wilson's disease	1	
Friedreich's ataxia	1	
2. Tumor	54	7
3. Vascular accident	62	4
4. Environmental and psychic causes	73	
5. Congenital mental or physical defects	87	
6. Toxic (diet, metabolism, poisons)	107	
7. Unknown, including multiple sclerosis, amyotrophic lateral sclerosis, muscular dystrophy and atrophy, epilepsy	144	
8. Mechanical and physical trauma	138	26
9. Infection	76	305
	743	342
	342	
Total	1,085*	

*The total of 1,085 is somewhat more than the number of patients seen. This difference is due to the fact that in some patients two or more causal factors were of equal importance.

offer problems in relation to the functions of the endocrines and the vegetative nervous system. With reference to the teaching of neural anatomy, since the statistics show (1) that over one half of all organic cases seen were represented by only seventeen different conditions, and (2) that three fourths of the neurologic cases have relation to major problems in internal medicine, it seems safe to assert that it is a mistake to confuse the undergraduate with a mass of fine details. He does not need to know anything about the bundle of Vicq d'Azyr, how many nuclei there are in the thalamus or the details of the *minor* association tracts linking the cortex, corpora striata, pons, cerebellum and cord.

There is one matter of importance that is not obvious in the statistics tabulated in this paper. If the neurologic service dealt with a larger proportion of psychoneurotic or psychiatric cases, it would be manifest that proper estimation of the patient's personality is of fundamental importance in properly evaluating his symptoms. Ability to do this depends on more than being told to remember the point. Every neuropsychiatrist has abundant experience with patients whose complaints have been wrongly judged by practitioners in other branches of medicine. Time and again, organic cases have been regarded for months or even years as "hysterical." The reverse is equally true. Too little attention is paid to this important part of diagnosis. It should be drummed into the head of every undergraduate. Not only do patients suffer needlessly because their physicians err in estimating the psychologic equation, but the flood of quacks is to a great extent maintained by persons whose physicians have not properly handled them as human beings.

TABLE 6.—*Site of Lesion Producing the Condition*

1. Peripheral nervous system	106
2. Cord	186
3. Brain	273
4. Vegetative nervous system (includes vasomotor)	15
5. Endocrines and vegetative nervous system	18
6. Mixed:	
a. Cord and brain	88
b. Cord and nerves	32
c. Cord and vegetative nervous system	2
d. Brain and vegetative nervous system	18
7. Not of central nervous system	55
8. Epilepsy	60
9. Psychic	88
10. Psychic and vegetative nervous system	20
11. Psychic and organic	30
12. Ill defined or unknown	12
Total	1,003

The organization of a neurologic service depends on the clinical material to be handled. Table 7 gives a rough classification of the patients cared for in the ward of the Bellevue Hospital neurologic service. The table itself needs no further comment except as regards Groups B and D. Group B patients are difficult to take care of. Home surroundings are usually impossible, and even if the municipality provided visiting nurses and physicians to see such patients, their lives would be shortened. The cost of upkeep of institutions for such cases would be decreased if such institutions were adjacent to a hospital equipped to care for acute medical conditions. In this manner, when custodial patients develop acute illnesses, they could be immediately transferred to a hospital for acute cases.

In Group D, a successful solution of the economic problem depends on providing occupation, with the aid of social service organizations. At present, Bellevue

TABLE 7.—*Classification of Ward Patients*

Class	No.	Comment
A. Cases for diagnosis and hospital treatment	174	Full hospital facilities; keep up from two to three months
B. Cases for diagnosis and needing only custodial care	48	After diagnosis, refer home or to an institution; keep from one to two weeks
C. Cases for diagnosis and ambulatory treatment	61	After diagnosis, refer home; keep from one to two weeks
D. Cases incurable, confined to the home, and in which economic rehabilitation could be effected by training in handicrafts and then sale of products	28	After diagnosis, refer home or for training in a separate ward or institution
E. Acute cases*	61 (20%)	Full hospital facilities; keep up from two to three months

*Included in this group are a few brain tumor cases and most of the spinal cord cases. These are acute because they reach the hospital at a time when delay in reaching a decision as to treatment would be dangerous.

Hospital provides occupational therapy for its patients. A good many of the neurologic patients stay in the ward for one to two months. Occupational therapy is of value in maintaining the morale of the patients while they are in the hospital. But there are many patients taught a useful trade who could contribute something to their support by making and selling various products after they have left the hospital. At present, such patients are dependent on charity, either from relatives

or that given by aid societies. When the sick person is the sole wage earner in his family, the whole burden is thrown on organized charity. It is impossible to estimate how many such cases there are in greater New York, but 5,000 is probably a conservative figure. A comparatively simple organization would furnish facilities for training such patients and then arrange for collecting and selling the products made by them in their homes. The administration cost of such an organization would certainly be less than the present system of giving all and allowing the patient to exist in idleness. This idleness certainly is not conducive to maintaining the self-respect and morale of the invalid. The chief obstacle to the success of such a scheme might lie in the resistance of labor unions. The unions have handicapped many of the war veterans who have been rehabilitated in various vocations and find it impossible to work in unionized trades because the unions will not admit them to membership. But this obstacle ought not to be very great, because a little publicity of the right kind would certainly silence any unions who tried to complain of the bread being taken out of the mouths of their members. In fact, a good many of the invalids who would be doing such work have already been union men in various trades, and no credit would accrue to unions that asserted opposition to unfortunates in such circumstances.

TABLE 8.—*Results of Treatment of Ward Patients* *

	Cured or Improved Per Cent.	Unimproved Per Cent.	Died Per Cent.
All cases	48.4	43.8	7.8
Organic	46.5	44.7	8.8
Psychoneuroses	75	25	
Psychoses	20	80†	

* Two hundred and eighty-three different patients admitted during 1921, with seventeen readmissions.

† These patients were transferred to the psychopathic service after a brief period of observation.

Table 8 suggests the necessity for a persistent optimism in every neurologist.

In the patient with chronic organic disease, improvement may be both subjective and objective. In cases in which treatment will produce a beneficial physical change, the patient feels the difference, and the improvement in morale is readily understood. Often one sees individuals in whom treatment can make no difference in the objective manifestations of the disease, yet such patients will tell a physician that they feel better, that their pains do not trouble them, or that they can get around more easily. The fact that these people have been sympathetically handled and thoroughly examined has been sufficient to alleviate the results of prolonged introspection and its attendant fears and despair. The patients feel better because they do not think about their troubles. Practically, such patients have to be regarded as improved, although from the material standpoint there is no change. There is a third group of patients in whom impairment of morale has caused them to stop using their bodies to the full extent possible. Multiple sclerosis, tabes and residual encephalitis cases illustrate this group best. After they have been in the ward for a week or two, they will be encouraged to make efforts and, as a result, learn that they are not so badly off as they feared. They will leave the hospital actually walking in a much improved way. There has been no change in the pathologic anatomy, but the function left is used to its fullest extent. In effecting improvement in chronic cases, the atmosphere of the ward is fully as important as any physical mode of treatment. A physician who treats his patients only as diagnostic problems will never be successful in the removal of what might be called "emotional overflow" symptoms. The average person demands *something* in the way of treatment. In my mind, physiotherapy produces benefit in organic neurologic cases, chiefly because it is a concrete demonstration, and is something new to the average patient.

HOSPITAL ORGANIZATION

Since approximately 7 per cent. of the patients admitted to Bellevue Hospital need a neurologic survey, it seems to me that every general hospital with a capacity of 500 beds should have a neurologic service. The staff of this service should include a sufficient number of attending physicians making regular rounds to examine the patients on whom consultation is requested. There should also be one intern whose full time would be devoted to the neurologic patients. He should examine every neurologic patient and be able not only to select those needing the attention of a visiting physician, but also to direct their treatment under the supervision of the visiting physicians. There should be a separate neurologic ward in every hospital of more than 1,000 beds. The intern staff should by all means be limited to those who have completed a general medical internship. It may be well to emphasize at this point that a neurologist has a function often quite distinct from that of a psychiatrist, and to my mind it is ridiculous for a man to call himself a neuropsychiatrist when his clinical training and experience are limited to psychiatry alone.

One must be careful about throwing stones, and it is just as true that a neurologist may make costly mistakes in dealing with psychopathic patients, because his experience has not been sufficient to develop judgment nice enough to tell him just when the patient reaches the point at which he must be confined to an institution.

As for the organization of the neurologic service, the classification of patients given in Table 7 suggests that there must be a sufficient number of beds to enable patients to be kept long enough to benefit by treatment. There is nothing to be gained by having a separate neurologic ward if the patients admitted to it are kept only for diagnosis. Moreover, the period of observation necessary for a reasonably accurate diagnosis varies greatly. We have found at Bellevue that two or three weeks of careful observation may frequently be necessary before a correct diagnosis can be established. Again, we confess that, at times, our diagnostic acumen has been completely baffled in certain cases. A former resident in our service used to account for some of the puzzling cases on the ground that the patients had failed to read the textbooks.

GENERAL CONSIDERATIONS

While it is true that a great many organic nervous diseases cannot be cured and that the course of the disease is long, these patients are just the ones to furnish material for medical research. They are important, too, because many of them, at one time or another, have been treated by cult practitioners. It is impossible to keep all chronic patients out of the hands of quacks, who secure confidence solely by making extravagant promises of relief or cure. We found that a large proportion of our chronic cases had never

been properly studied and diagnosed by any one; and once these patients had been carefully examined and observed, adjusted themselves well to the fact that their diseases were incurable.

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NONUNION IN FRACTURES: THE MASSIVE BONE GRAFT *

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Ununited fractures may be divided into those delayed in uniting and those in a fixed state of nonunion. In the former there is still evidence of attempts at union, but in the latter all such evidence is lacking. At operation a false joint is found, many times with a sac smoothly lined and filled with amber colored, slightly viscid fluid. Delayed union may exist as long as two or three years after the original injury, and nonunion as early as a few months.

In delayed union the bones may be induced to unite by such means as weight bearing, use of the Thomas dam, pounding between tourniquets, and so forth; such methods are useless in cases of nonunion.

REVIEW OF CASES

This paper is based on a review of 221 cases of nonunion culled from approximately 1,000 cases of old fractures, consisting of malunions and delayed unions, and so forth, that have been observed in the Mayo Clinic during the last ten years. In making this classification, a sharper line has been drawn than formerly in separating the cases of nonunions from the cases of delayed unions.[1]

One hundred and eighty-four of the 221 patients were traced; 138 (75 per cent.) have obtained union, and forty-six (25 per cent.) failed to obtain union. Twenty-seven patients were not traced, and ten are still under observation.

Fractures of the Femur.—There were forty cases of nonunion in the neck of the femur and thirty in the shaft, making seventy in all. The condition in the femur is difficult to deal with. For purposes of study, the fractures have been divided into those of the hip and those of the shaft.

Findings in Two Hundred and Twenty-One Cases, May 21, 1923

Bones	Cases	Result Determined	Cures	Per Cent.	Failures	Not Traced	Under Observation
Femur—							
Hip	40	33	19	57.5	14	4	3
Shaft	30	24	15	62.5	9	2	4
Tibia	54	44	36	81.8	8	8	2
Humerus	41	37	26	70.2	11	3	1
Radius	20	15	14	93.3	1	5	0
Radius and ulna	18	14	12	85.7	2	4	0
Patella	9	9	9	100.0	0	0	0
Ulna	8	7	6	85.7	1	1	0
Clavicle	1	1	1	100.0	0	0	0
Total	221	184	138	75.0	46	27	10

Fractures of the Hip: Twenty-eight of the forty patients in the series were males and twelve were females. The youngest was 21 years of age and the oldest 64, the average age being 46.1 years. The average duration of nonunion was one and seven-tenths years. The greater number of these patients had not been treated at the time of their injury, because the condition had not been diagnosed, and none of them, as nearly as could be ascertained, had been treated adequately, such as by the modern method of treatment advanced by Whitman. Only one had been operated on. Two infections followed operation in the Mayo Clinic in this group of patients.

Metal nails were used in five cases, with three good results. Beef-bone screws were used in two, with good result in one. The autogenous graft, using the tibia, and more recently, the fibula (Fig. 1), was employed in thirty cases; in twenty-six of the latter, sufficient time has elapsed since the operation so that results may be determined; in fifteen of the patients, function has been restored and they may be called cured. Thirty-three of the forty patients were traced. Nineteen (57.5 per cent.) were found to have bony union; fourteen were unimproved. Four of the patients were not traced, and three are still under observation.

Fig. 1.—Nonunion of the hip of two years' duration: Fibula used as a graft; osteoperiosteal graft also wrapped about the fractured bone.

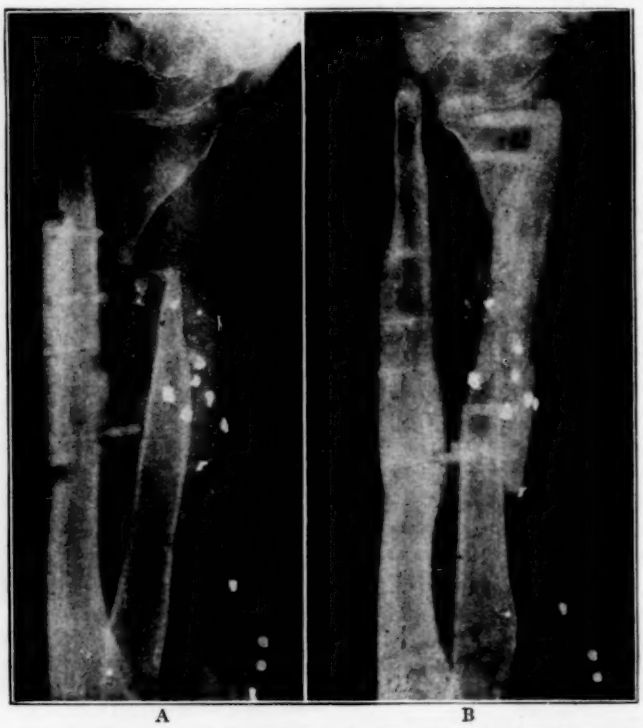
Fractures of the Shaft of the Femur: Of the series of thirty patients with fractures in the shaft of the femur (six compound), eighteen were males and twelve were females; the average age was 29.4 years. The average duration of nonunion was three and three-tenths years, ranging from one and one-half to seventeen years. The fractures were in the upper third of the bone in eight, in the middle third in fourteen, and in the lower third in eight. Seventeen patients had been operated on, and seven of these had been infected. Two developed infections following operation in the Mayo Clinic. Three of the patients were suffering from severe generalized osteitis fibrosa cystica. Nonunion in the upper third of the bone is particularly difficult to treat successfully. Twenty-four of these patients were traced; fifteen (62.5 per cent.) have union and nine failed to obtain union.

* From the Section on Orthopedic Surgery, Mayo Clinic.
* Read before the Section on Orthopedic Surgery at the Seventy-Fourth Annual Session of the American Medical Association, San Francisco, June, 1923.

1. Henderson, M. S.: Old Fractures, Journal-Lancet **40**: 687-695 (Dec. 15) 1920. Meyerding, H. W.: Delayed Union and Nonunion of the Radius and Ulna. Minnesota Med. **4**: 223-228 (April) 1921.

Two patients were not traced and four are still under observation.

Fractures of the Tibia.—Of the fifty-four patients with nonunion of the tibia, the fracture had been compound in twenty-seven. There were forty-six males and eight females. The youngest was 2 years of age and the oldest 60; the average age was 26.3 years. The average duration of nonunion was four years; the longest was seventeen years and the shortest nine months. Five of the fractures were in the upper third of the bone, three in the middle third, and twenty-six in the lower third. Infection either at the time of the injury or at subsequent operations occurred in twenty-eight cases. Thirty-nine of the patients had been operated on, many of them a number of times. Thirty-nine of the operations in the Mayo Clinic consisted of bone grafting, with four failures. There was infection in six; one of these patients had been operated on elsewhere without infection. The infection followed breaking down of the scar. The other four patients had been infected previously. Six of the failures in this series were in children who had sustained the fracture at birth or in infancy, and we operated before the age of puberty. Three were not operated on until after puberty, although the fractures were sustained in early childhood; union was obtained in all of these. Based on this experience with these intractable nonunions in children previously operated on, it is our custom to advise postponing operative measures until after puberty.



A B

Fig. 2.—Nonunion of the radius and ulna with loss of substance in the radius caused by shotgun injury: *A*, first operation, April 28, 1922; massive graft to ulna; *B*, second operation, May 1, 1923; massive graft and osteoperiosteal graft to the radius.

Half of the fractures in this group were originally compound, many of them characterized by great trauma and destruction of bone. The fibula usually unites early and acts as a pivot round which the tibia swings; and in some cases, I feel sure, is responsible for the failure of union. Forty-four patients were traced; thirty-six (81.8 per cent.) were cured. Eight were not traced and two are still under observation.

Fractures of the Humerus.—There were forty-one cases of nonunion of the humerus, sixteen originally compound. Thirty-five of the patients were males and six were females; the oldest was 70 years and the youngest 25; the average age was 36.3 years. The average duration of nonunion was two and thirty-seven hundredths years, the shortest being one-half year and the longest thirteen years. The fractures were in the upper third of the bone in seven of the patients, in the middle third in eighteen, and in the lower third in sixteen. Twenty-four of the patients had been operated on and eighteen had been infected. Seven were infected following operation in the Mayo Clinic, two of whom had not been infected previously. Seven of the patients had musculospiral paralysis at some time during the disease. Two patients were paralyzed temporarily following operation. Thirty-seven patients were traced; twenty-six (70.2 per cent.) had solid union and eleven had failed to obtain union. Three were not traced and one is still under observation.

Fractures of the Forearm.—Forty-six patients had nonunion of one or both bones of the forearm. Thirty-six were traced and thirty-two (88.8 per cent.) found to have union. For the purpose of study we have grouped these patients into those with nonunion in the radius alone, in the ulna alone, and those with nonunion in both bones.

Fractures of the Radius Alone: There were twenty patients in this group, seven of whom had compound fractures. Nineteen were males and one was a female. The oldest was 47 years and the youngest 11; the average age was 27.4 years. The average duration of nonunion was two years, the longest was six, and the shortest, one. There were no fractures in the upper third; there were five in the middle third and fifteen in the lower third. Twenty-six operations had been performed previously on fifteen of the patients. Bone grafting operations were performed in the Mayo Clinic on nineteen of the patients, and no infections followed. Fifteen were traced; fourteen (93.3 per cent.) were cured and one had failed to obtain a cure. Five were not traced.

Fractures of the Radius and Ulna: There were eighteen patients in this group, twelve of whom had compound fractures. Seventeen were men and one was a woman. The youngest was 22 years of age and the oldest 60; the average age was 36.3 years. The average duration of nonunion was three and seven-tenths years; the longest was twenty years and the shortest, six months. The locations of the fracture may differ. The upper third of the radius was fractured in two cases, and of the ulna in three; the middle third of the radius was fractured in eight, and of the ulna in nine; the lower third of the radius was fractured in eight, and of the ulna in six. Fourteen patients had been infected and thirteen had been operated on previously. Five patients, all previously infected, developed suppuration. Undoubtedly the difficult and prolonged operation on the two bones at one time increased the chance of infection. The twisting injuries, such as being caught in belts and wheels, were prominent in this group. The bone graft was used on ten patients (Fig. 2); union was not obtained in two. Fourteen of the patients were traced; twelve (85.7 per cent.) were cured and two failed to obtain cures. Four patients were not traced.

Fractures of the Ulna Alone: There were eight patients in this group; only one had a compound fracture. Seven were men and one was a woman. The oldest was 40 years and the youngest 21; the average age was 29. The average duration of nonunion was one and one-fourth years; the longest was two years and the shortest eight months. The fractures were in the upper third in two, in the middle third in five, and the lower third in one. None of the fractures had been infected and no infection followed operation in the Mayo Clinic. Seven of the patients were traced; six (85.7 per cent.) were cured and one failed to obtain cure. One patient was not traced.

Fractures of the Patella.—There were nine of these patients, seven men and two women. The youngest was 26 years and the oldest 53; the average age was 36. The average duration of nonunion was one year; the longest period was five years and the shortest three months. The fractures had not been previously infected and no infections followed operations in the Mayo Clinic. In old nonunions in this bone, owing to the contraction of the quadriceps, it is very difficult to bring the upper fragment down to the lower. This may readily be accomplished by dissecting the upper fragment entirely free and bringing it down to the lower fragment. Beef-bone screws are used to hold them firmly in apposition, and the soft parts are sutured around the united patella. The results have been excellent. All of the nine patients were traced and all are cured.

Fractures of the Clavicle.—There was one patient with nonunion of the clavicle, treated successfully by plastic operation.

ETIOLOGY

It is often impossible to determine why union does not take place in any given case. A detailed statistical study of the reasons for nonunion is of little or no value. Certainly no one factor is responsible for all nonunions. One outstanding feature is that practically all the patients had been free from any constitutional disability that might have some bearing on the condition, with the exception of the cases of osteitis fibrosis cystica. Syphilis is a negligible factor in the series; this statement is based on the fact that careful tests were carried out on all patients. With the exception of fracture of the hip joint, interposition of muscle, combined with severe twisting and crushing traumas, is, after all, probably the most common cause. It is quite likely that many fractures, delayed in uniting, have reached a state of nonunion as a result of repeated manipulation and examinations by overanxious attendants. A callus, once broken down, is very loath to form again. Lexer[2] believes that local, rather than constitutional, causes are to be considered, with emphasis on a poor blood supply to the ends of the fragments. In certain instances following operative interference, metal plates and screws were undoubtedly a factor in the induction of nonunion.

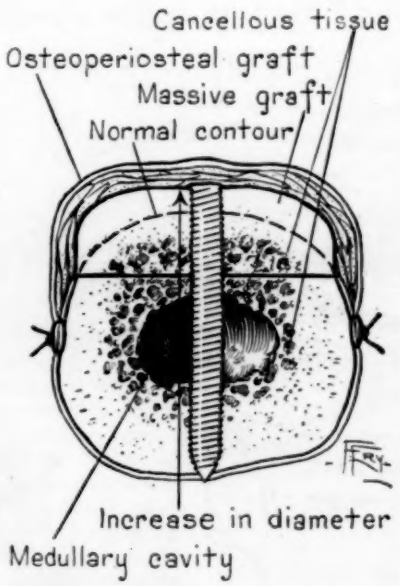


Fig 3.—Use of the massive graft held in place by beef-bone screws and the osteoperiosteal graft wrapped over it.

During the last few months, ninety-six tests were made of the blood of twenty-one patients, with delayed union or nonunion, in order to learn the percentage of calcium, magnesium and phosphorus. The tests consisted of determining the number of milligrams of calcium and of magnesium in 100 c.c. of serum, and the number of milligrams of inorganic phosphorus and of lipoid phosphorus in 100 c.c. of blood. No departure from the normal could be found, except that in a few cases the magnesium content was lowered. I am satisfied that further investigation, so far as the calcium and phosphorus content of the blood in cases of nonunion is concerned, will be of no value. This coincides with the work of Tisdall and Harris.[3] The magnesium content, however, will be investigated further.

Nonunion can seldom be attributed to the treatment except in cases of fracture of the hip joint, and here the fault is one of omission, because in most of the cases the diagnosis is not made until long after the injury has occurred.

TREATMENT

I shall not discuss in detail the relative merits of the various methods of treatment, but shall describe briefly measures which now seem best adapted to induce union in these refractory cases.

If the nonunion has existed for many years and the patient has been using the limb freely in spite of the pseudarthrosis, it is usually easier to obtain union than if the duration had been shorter, because the bone, except for the eburnated ends, is normal. The eburnated ends of the bone must be thoroughly freshened, and ample contact of healthy bone in the fragments either to each other, or to the autogenous graft, assured. Osteoporosis of the fragments, due to long fixation, should first be overcome by the patient's using the extremity, thus increasing density of bone before operation is resorted to.

It is difficult in private practice to set a definite time limit for interference after the healing of a sinus. From experience, I have learned to beware of the recently healed sinus, of the scar that is red, of the local heat that remains, and of the semibrawny "feel" of the part. Baking and massage will cause the part that carries a latent infection to display these signs, and are advantageous as a test.

In a recent report of 100 cases of ununited fractures, mostly of the forearm, by Mitchell,[4] it is shown that excellent results may be obtained by modern methods. Military control, such as he had, is of great aid, as it enables one to select the most favorable time for operation. This cannot be done so consistently in private practice.

The fact that nonunions are occasionally successfully treated by the use of metal plates or screws does not, in my opinion, warrant their use as a routine. Beef-

2. Lexer, E.: Pseudarthrosis, Arch. f. klin. Chir. **119**: 520-607 (April) 1922.

3. Tisdall, F. F., and Harris, R. I.: Calcium and Phosphorus Metabolism in Patients with Fractures, J. A. M. A. **79**: 884-886 (Sept. 9) 1922.

4. Mitchell, A. P.: Ununited Fractures, Brit. J. Surg. **10**: 259-289 (Oct.) 1922.

bone screws and plates are ideal for recent fractures; they are also useful in fractures delayed in uniting, but, generally, should not be used in cases of nonunion.

Stepping operations, whereby enough of the bone is removed to permit of broad contact with the bony surfaces, is objectionable chiefly on account of the necessary shortening. This is, perhaps, of secondary importance in the upper extremity, but is decidedly objectionable in the lower.

The inlay graft of Albee is a sound surgical procedure. Its only objection, I believe, is that, at times, as in fractures of the forearm, it is too small. The larger the graft, the better; it must extend well beyond the fracture line to the sound bone of each fragment. I use the massive graft more often. The fragments of the fractured bone, after the ends have been freshened, are chiseled or sawed off on one side, so that the deep layer of the cortical bone, rich in active bone-forming elements, is exposed, and this is brought in contact with the same type of tissue in the graft (Fig. 3). A large graft is taken from the flat internal surface of the tibia and applied firmly to the fragments by the aid of beef-bone screws, thus obtaining firm splinting action. The autogenous bone pegs may be used to advantage in fixing the graft, as I have seen done by Albee and Campbell. My reason for preferring the beef-bone screws is that they are ready for use, and time is thus saved. The chief arguments in favor of the autogenous massive graft may be stated briefly: (1) When firmly fastened, it gives a higher degree of internal fixation, which I consider very essential; (2) it gives a broader contact of the bone-forming elements found deep in the cortical layer of bone than the other methods, and (3) its size more readily affords splintlike support, the time of absorption and replacement is longer than in a smaller graft, and callus is more mature and strong when the "weak period" of the graft is reached, usually from six to eight weeks after the operation, and a fracture of the graft is thus of less serious moment. As a further step, Thomas [5] has advocated the use also of the osteoperiosteal graft (Fig. 4). Needless to say, adequate external fixation by splints, braces or casts is essential. For fractures of the hip, it has been our practice to use 10 cm. of the entire thickness of the fibula instead of a graft from the tibia.

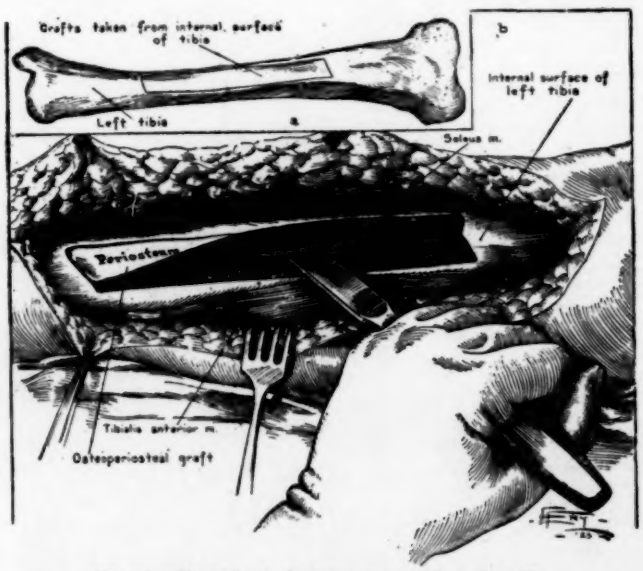


Fig. 4.—Method of obtaining osteoperiosteal graft.

COMMENT

In reviewing these fractures as a whole, it will be found that there are a greater number of nonunions in the femur than in any of the other bones, the neck of the femur furnishing forty and the shaft thirty. The tibia comes next with fifty-four to its credit; the humerus next with forty-one; the radius alone with twenty; the radius and ulna combined with eighteen; the patella with nine, the ulna alone with eight, and the clavicle with one. The causes of nonunion are usually indeterminate, but interposition of muscle fibers, inadequate fixation, not only in quality, but also in quantity (time), too early weight-bearing, and needless inspections and examinations when the union is delayed, may be mentioned as chief among the local causes. In my experience the general or constitutional causes have rarely been of consequence. It seems paradoxical that any number of fractures will heal in a frail, pale, worn out, washed-out appearing child with osteogenesis imperfecta, whereas not one will unite in a big, robust man. Severe crushing and twisting traumas may so devitalize the tissue and lead to the formation of scar tissue as to be a factor in the production of nonunion. Besides all of these, however, there remains the inexplicable type of nonunion. The ends of the bone are in apposition, the position is all that could be desired, and the treatment in all respects satisfactory, and yet union does not occur.

The average percentage of successful cases in the series was 75, ranging from 57.5 in fractures of the hip, to 93.3 in those of the radius. The bones, named in the order of best results, are the patella, radius, ulna, tibia, humerus, shaft of the femur, and neck of the femur. The failures, I believe, were due chiefly to the use of a small graft, improper and inadequate internal fixation of the graft, inadequate external fixation, and sepsis. There were twenty-two infections following operations, approximately 10 per cent. The fact that there were 133 fractures in the lower extremities with ten infected, and eighty-eight fractures in the upper extremities with twelve infected, leads one to suspect that the lower extremity is more resistant to infections than the upper. The rarity of infections following extensive operations on the feet sustantiate this view.

The massive graft with proper internal fixation, the selection in the previously infected cases of the most opportune time for operation, the avoidance of prolonged operations, if necessary doing them in two stages, the maintenance of adequate postoperative fixation, and, in the lower extremity, the avoidance of too early weight-bearing, will materially increase the percentage of successes.

CONCLUSIONS

1. Nonunion is a fixed state in which the bone has ceased to attempt to repair, and is to be differentiated from delayed union.

2. In the series of 221 cases, the nonunion was in the lower extremity in 133, and in the upper, in eighty-eight. The femur was involved in seventy cases, forty in the neck and thirty in the shaft; the tibia in fifty-four; the forearm in forty-six; the radius alone in twenty, the radius and ulna together in eighteen, and

5. Thomas, H. B.: Treatment of Old Ununited Fractures of Long Bones, J. A. M. A. 80: 309-315 (Feb 3) 1923

the ulna alone in eight; the humerus in forty-one, the patella in nine, and the clavicle in one. The most common site for nonunion in the shaft of the femur was in the middle third; in the tibia, the lower one third; in the humerus it was about evenly divided between the middle and lower third; in the radius and ulna combined, the site was most common in the middle third. In the radius alone it was most common in the lower third, and in the ulna alone, in the middle third.

3. The bones named in the order in which the best results were obtained are the patella, the radius, the ulna, the tibia, the humerus, the shaft of the femur, and the neck of the femur.

4. The massive autogenous graft is preferred, and firm internal fixation of the graft to the fragments is also essential.

5. The fact that occasionally success follows the use of metal plates, bone screws, beef-bone plates, and so forth, does not establish the fact that they are to be preferred to the bone graft. In a large series of cases there is ample proof of their inadequacy.

6. Adequate external fixation must also be provided.

ABSTRACT OF DISCUSSION

DR. DEAN LEWIS, Chicago: The cause of nonunion varies in different forms of fractures. While insufficient immobilization may be the cause of nonunion of one fracture, it may favor union of another. The same applies to infection. In my experience, the interposition of soft parts, syphilis and alteration in the secretion of ductless glands are rarely the cause of nonunion. The separation of fragments, a large blood clot, infection, insufficient immobilization and sclerosis of the ends of the bones may cause nonunion. In the treatment the cases must be individualized. I have had an unfortunate experience with fractures in the young—in the cases of so-called congenital pseudarthrosis. This condition is apparently associated with a localized periosteal dysplasia, resulting in nonunion. A tenotomy of the achilles tendon should first be done to permit of correction of the deformity; firm fixation should then be secured, and an osteoperiosteal graft employed. The only case of this type in which union occurred had been treated in this way. In treating nonunion, the fracture surfaces must be approximated carefully, the periosteum sutured to the graft, if one is employed, and for that reason, I believe that periosteum should be taken with the graft, and the surfaces of the graft contacted accurately with the bone into which it is grafted. In many cases repeated operations will be required, but I believe that in most cases success can be obtained eventually. Those cases in which a large callus forms but which slowly disappears often present the most serious problems. After the use of the graft, firm immobilization is an important factor in treatment.

DR. WALTER B. COFFEY, San Francisco: The treatment of fractures cannot be standardized, nor can splints be standardized. Every case is a law unto itself. Certain principles are imperative. The outstanding desideratum is to obtain function. Hunter and Hilton spoke of forced rest; Taylor and Sayer of extension. Thomas, in his practical way, recognized these principles, but demonstrated that the excess of either was damaging to function. Dr. Henderson, dealing entirely with nonunion (not delayed union), brings forth the impressive fact that in no field of prospective surgical intervention is prognosis so uncertain as in fracture cases. Infections, devitalization of tissue, scar tissue, interposition of tissue, uncertain methods of internal and external fixations, one or the other, play a part in the nonunion of fractures. Constitutional conditions, especially syphilis, play practically a negative part. Dr. Henderson, in discussing the relative merits of the various methods of treatment, offers this sound principle. Osteoporosis of the fragments, due to long fixation, should first be overcome by instructing the patient to use the part affected, thus increasing the density of the bone before resorting to operation. I would add that osteoporosis, or decalcification, is not the proper tissue for a bone graft. Nor is it for foreign material or any other type of internal splint that the case may demand. I have never seen osteoporosis or decalcification of the clavicle following fixation by external splints, incident to the treatment of fracture of this bone. It is impossible to immobilize it. Prolonged rest of a part, infections, constrictions by tight splints, or trauma, will bring on osteoporosis. The general surgeon observes osteoporosis in the amputation of the breast, where there later develops edema of the arm. The circulation is good, but there is an interference with the lymph flow. The roentgen ray will show a rapid decalcification or osteoporosis. What part does lymph play in the formation of union? The physiologists maintain that the lymph contains the lime salts, and that lymph flows only by muscular activity. The obstruction to, or the impairment of, lymph circulation to the bone is responsible for this osteoporosis. Thomas advocated that, in delayed union, the patient should get up and about, his theory being that the friction of the ends of the bone would bring on union. It is my opinion that muscular activity, with the flow of lymph, brings on union. Experience has taught us that a bone graft will not bring results when placed in such tissue; nor is that case suitable for operative procedure by any other method. Frequently one sees union of comminuted bones, when perfect adjustment is impossible and an external splint is objectionable. Rarely does one find osteoporosis in such cases. One can readily observe the factors that produce nonunion in compound, comminuted or infected fractures and destruction of soft parts, and impairment of nerve or blood supply. As Dr. Henderson says, only time and use of the limb will bring about a suitable bed for a bone graft, and a good blood supply. The ebonated ends of fibrous tissue should be removed, for new bone will not develop in the presence of such tissue. Barring all types mentioned by Dr. Henderson, there is that rare individual who is not only subject to fractures but subject to nonunions.

DR. JAMES EAVES, San Francisco: In cases of nonunion are there not many other factors to be considered that might possibly interfere with union? It is regrettable that in nonunion of fractures after repeated operations no result is obtained in spite of being exact in accepted technic. Often in industrial cases the statute of limitations of medical and compensable liability expires, making it imperative for closure, and as a last resort amputation becomes essential. I have seen numerous cases of nonunion, many being referred to me from all parts of the state. Nonunion of the lower third of the tibia I find the most difficult to treat. From observation of these cases, a deep impression has been created in my mind, and I often notice that these patient's are what I call the effeminate type. Do they lack some essential for repair, such as glandular extracts? In one case in which the fibula was transplanted from the sound leg, not the least sign of active regeneration of it was ever evident. In order to avoid unnecessary operations, should we be justified in these cases to remove a small portion of a metatarsal and, if active regeneration was not evident, use this as an indication and forego useless operations?

DR. S. L. HAAS, San Francisco: In the points brought out by Dr. Henderson, he mentioned, as I understood him, that constitutional elements played no rôle. However, he said that in cases of fracture before puberty one always has difficulty in securing union after nonunion had once occurred. The bones of children generally heal very rapidly. There is plenty of callus thrown out in an ordinary fracture. In cases of nonunion there is evidently something wrong with that particular individual. It is not a case of mechanical interference. In the adult who has nonunion it is often necessary to do repeated operations. One performs them in the exact way as one does successful operations in other individuals, but still there is a failure of union. It suggests itself to me that in those cases of nonunion there is some particular factor—one may call it an osteoclastic factor—which elements are destroying quicker than the osteoblasts are building up. Whether the exact factor that is responsible is due to the deficiency of internal secretion or chemical elements has thus far not been proved; but I believe that there is

something in the particular individual that is deficient and is of prime importance.

DR. CARL BECK, Chicago: Every one has mentioned the endocrines. Bossi was the first to make experimental studies on this subject, and he has shown, by exclusion of the suprarenal of young animals, that osteoporosis occurs and is one of the factors causing nonunion. Some years ago I published an essay on osteoporosis. I had done some experimental work and also treated patients, feeding them with suprarenal substance and injecting epinephrin hypodermically, and it produced better bone and quicker union. I would advise in all cases of delayed union the use of suprarenal substances. It has to be proved by the roentgen ray sometimes that there is rapid union in those cases, especially in young persons. All these observations point to the fact that union is delayed only in those cases in which suprarenal and other endocrine substances are missing.

DR. ARCHIBALD CHACE, Texarkana, Ark.: I have heard a good deal about the treatment of nonunion, except the prophylactic treatment. My work is entirely among adults, and in the last series of 800 cases of fracture I have had only one case of nonunion in which there was not a sufficient destruction of the entire bone at the time of the original accident to prevent any possibility of union. I think that is due to three or four factors. All our patients are hospitalized. Every case is treated as a law unto itself. Every patient is examined most thoroughly from the general physical standpoint, and very active antisyphilitic treatment is given if necessary. The fourth point that is emphasized is early active motion, not passive motion. With those four factors I think the results are fairly consistent and fairly good, and we shall not have these cases of nonunion, except in the one class—if these four factors are tenaciously carried out.

DR. E. W. CLEARY, San Francisco: I did not hear all of Dr. Henderson's paper but several points occurred to me. One is the preparation of the patient. It seems to me that it is of primary importance, when one is going to graft bone, that the condition of the affected limb be made as good as possible before the operation is undertaken. It has been my practice, since army experience called attention to this feature of the problem, to use physiotherapy consistently and extensively in preparing the limb for bone grafting. By every method known to legitimate physiotherapy I undertake to stimulate the circulation, to stretch the scar tissue, and to bring the bone into the best possible condition before the operation is undertaken. And, incidentally, as Dr. Albee suggested the other day, we use the patient roughly in physiotherapy for two or three weeks before a graft is to be placed in order that if there is any latent infection that infection may be revealed and save us the humiliation of lighting it up by an operation. In the small but considerable series of bone graftings that I had an opportunity to do in military service, so far as I was able to follow the cases, the percentage of success was much higher than it has been in civil cases. The reason for this, so far as I can determine, was the youth of the patients and the fact that the wounds were relatively recent in the army cases. I should like to ask Dr. Henderson a question in regard to his osteoperiosteal graft. In the illustration, as I interpreted it, he spread the osteoperiosteal graft across the top of the massive bone graft. I should like to know whether that is true, because it has always seemed to me very important that a massive graft has as great a surface contact as posible with the blood supply, already established, so that it will take up the blood supply as soon as possible.

DR. WALTER BALDWIN, San Francisco: Dr. Henderson spoke of the difficulty of immobilizing fractures of the humerus bone grafting, and I think that except in expert hands it is a difficult matter. In those cases, except when there has been great loss of substance, I have made no attempt to bone graft, but have done a direct bone suture, sometimes splitting the fragment lengthwise to allow the circulation to get through. I do not think the objection to shortening the humerus can be a real factor, because a shortening of one-half or three-quarters inch can have no practical significance. Union occurs very much quicker, and is much more certain than when bone is grafted.

DR. M. S. HENDERSON, Rochester, Minn.: The discussion has brought out some points that I touched on in the paper, but could not very well emphasize in reading the paper. Dr. Lewis mentions fixation. In looking over these histories I feel that inadequate fixation, both in quantity and in quality, so to speak, is a factor in the production of nonunion. Childhood fractures are resistant. I recently operated on a boy, 18 years of age, for whom I had ten years ago tried to obtain union of a fracture. We had, following that operation, union for one year. One day, while walking, the leg broke again and he has had nonunion ever since. This time I used the massive graft. The medicolegal side of the question is of interest. I could not help but notice, in going over these cases, that really the physician is rarely, if ever, to blame. The single exception was the hip joint, and that was an act of omission rather than commission. The diagnosis was not made in a single case at the time of the original injury. Drs. Beck, Haas and Eaves spoke of the glandular extracts. I can only say that I do not think glandular extracts will help in any way, unless in exceptional cases. I have tried them, and from practical experience I do not think that they are of any use. I think that the only thing that is of some use is cod liver oil, used in the form of an egg emulsion with phosphorus. I have learned to avoid the wound with a draining sinus and to beware of the recently infected, or the red or brawny scar. We give physiotherapy, baking and massaging, to see whether an infection will light up. Our results have been improved by putting the osteoperiosteal graft over the massive graft. Dr. Baldwin brought up the point about the humerus being difficult to hold. That is so, but if one will use a massive graft and fasten it securely by screws, or by bone pegs, a firm fixation will be obtained; also one takes off enough of the fragments to go back to good bone. The massive graft used in this way will give excellent results.

PREGNANCY AFTER INTERPOSITION OF THE UTERUS *

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For the correction of uterine prolapse and cystocele, the operation of interposition is practically the universal procedure of choice. By this method, the bladder is elevated in the pelvis and is prevented from again descending by the uterine fundus. The principles of the operation as described by both Wertheim and Watkins are essentially these: 1. The bladder is supported by and rests on the posterior wall of the uterus. 2. The uterus is anteverted in the pelvis, being tipped forward about 180 degrees. By virtue of this torsion, the broad ligaments are twisted and perceptibly shortened. 3. The long axis of the uterus makes an acute angle with the vagina, thus preventing any descent of the cervix into or through that passage. The end-result of a properly performed interposition is illustrated in Figure 1.

Although a successful procedure for prolapse, interposition of the uterus presents a decided hazard to future pregnancy. Prolapse is encountered most frequently after the menopause; however, we are often called on to correct various degrees of prolapse during the child-bearing period. Although both Wertheim [1] and Watkins [2] described modifications suited to patients operated on in this period, we find an occasional disre-

* Read before the Section on Obstetrics, Gynecology and Abdominal Surgery at the Seventy-Fourth Annual Session of the American Medical Association, San Francisco, June, 1923.

1. Wertheim: Centralbl. f. Gynäk. **23**: 369, 1899.
2. Watkins: Surg., Gynec. & Obst. **2**: 659, 1906; Am. J. Gynec. & Obst., November, 1899; Am. J. Obst. **65**: 1, 1912.

gard of this portion of the technic, resulting in grave dystocia whenever pregnancy occurs. Sometimes sterilization is attempted but is unsuccessful. Because of the fixation of the anterior wall and fundus of the uterus, only the posterior wall is available for development during pregnancy (Fig. 2), and at term one finds the cervical canal perpendicular to the axis of the inlet.

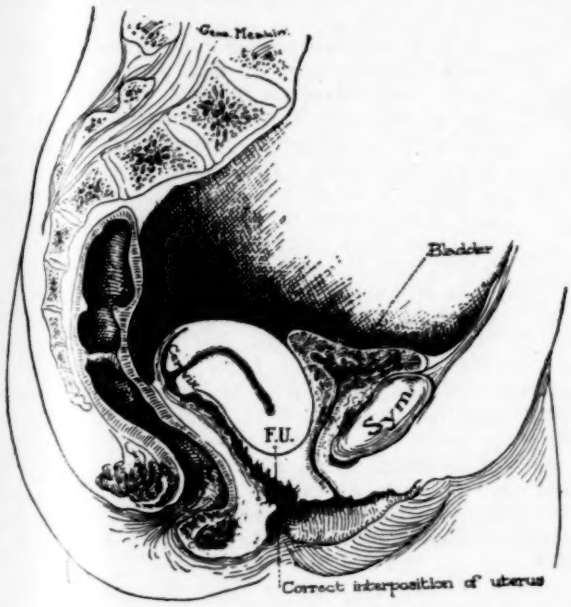

Fig. 1.—Correct interposition of uterus.

Thus, the pelvic inlet is obstructed by the undeveloped anterior wall of the uterus, and labor results in a tendency to flatten the cervical canal from side to side instead of obliterating it from above downward.

The occurrence of pregnancy in a uterus so placed must be regarded by the obstetrician with the same degree of concern as a marked pelvic contraction or a tumor blocking the birth canal. He must decide early whether to interfere in the first months or to permit pregnancy to progress to full term. The early termination by the vaginal route is unsatisfactory, as it necessitates splitting the anterior wall of the uterus, and without dissecting out the anterior vaginal wall and loosening the fundus from its favorable attachment, the necessary sterilization cannot be carried out. By means of abdominal section, hysterotomy and tubal resection can be done, and the child sacrificed. This may be advisable in the presence of an additional indication for therapeutic abortion.

At term (Fig. 3) we are confronted with a unique situation. By abdominal palpation we may discover no unusual condition except, perhaps, a crossbirth. In our cases as well as those previously reported by others, transverse presentation of the fetus predominated. By vaginal examination, we discover that the cervix is high up near the promontory of the sacrum; sometimes it is so high that the whole hand must be inserted into the vagina in order to reach it. The anterior uterine wall is felt firm and thick. The cervix cannot be reached by the usual rectal digital examination. The cervix points upward and backward, its canal often lying parallel to the plane of the inlet. Weibel,[3] reporting from Wertheim's clinic, also noted this inaccessibility of the cervix, and Holland[4] mentioned it in all three cases occurring in the British series. With the cervix in this position, rendering spontaneous labor impossible, and the anterior uterine wall fixed to the anterior vagina, there is only one rational procedure for the treatment of advanced pregnancy, namely, abdominal hysterotomy.

The literature is somewhat scant on this complication of pregnancy, obviously because the majority of gynecologists who utilize the interposition principle reserve this operation for the postclimacteric group of patients. We find, however, that Weibel reported two cases in 1916, and found, in addition, the small total of five in the literature. In Williams'[5] analysis of 20,000 labors reported in 1921, of which 183 were terminated by cesarean section, no cases of pregnancy after interposition of the uterus were included. In the discussion of a case report, Davis[6] mentioned having performed a cesarean section in one case after the interposition operation. Three cases were mentioned by Holland in the British investigation of cesarean section referred to above. Of the five cases reported by Weibel, two (those of Halban and Thaler) were terminated by abortion; the remaining three patients (Esch,[7] Hutelson[8] and Freund[9]) were operated on at term. Weibel's cases were both instances of women with prolapse who were operated on during the childbearing period and in whom sterilization was omitted in the course of the interposition. The first was terminated by abortion, followed by sterilization by atmocausis; the second went to term. He then found hydramnios and a transverse presentation of the fetus. The cervix was located with difficulty high above the promontory of the sacrum, and the anterior wall of the uterus was found thick and firm. Abdominal hysterotomy through the posterior wall and fundus was performed, and the patient was sterilized by tubal resection.

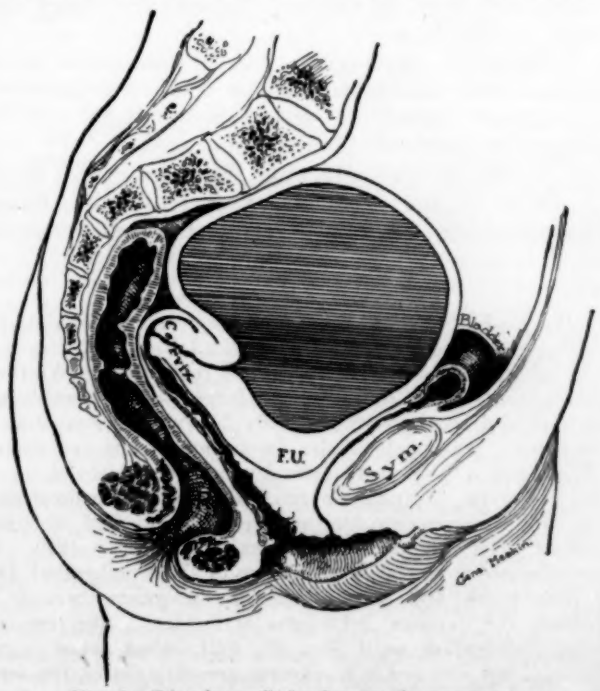

Fig. 2.—Posterior wall development in pregnancy.

3. Weibel: Arch. f. Gynäk. **105**: 65, 1916.
4. Holland: J. Obst. & Gynec. Brit. Emp. **28**: 358, 1921.
5. Williams, J. W.: Bull. Johns Hopkins Hosp. **32**: 173 (June) 1921.
6. Davis, A. B.: Am. J. Obst. & Gynec. **5**: 201, 1923.
7. Esch: Gynäk. Rundschau, 335, 1911; quoted by Weibel.
8. Hutelson: Frommel's Jahresb., 1912, p. 89; quoted by Weibel.
9. Freund, R.: Ztschr. f. Geburtsh. u. Gynäk. **67**: 551; quoted by Weibel.

In Esch's case, no sterilization was done at the time of the interposition of the uterus. At term, he found a transverse presentation of the fetus, and the cervix out of reach.

Pregnancy occurred soon after the interposition, in the case reported by Hutelson, although tubal ligation

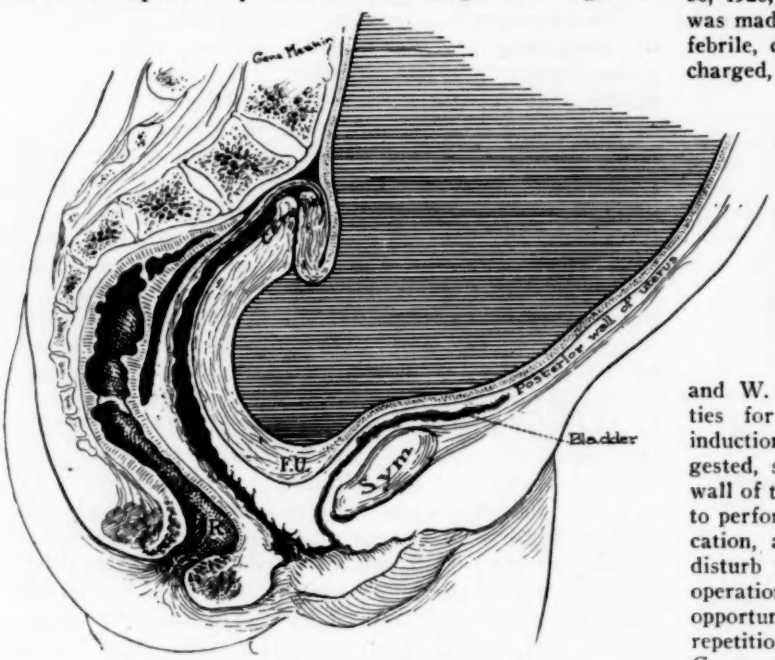

Fig. 3.—Full term pregnancy after interposition.

had been done. In this instance, labor was allowed to proceed seven days, when sepeis occurred, and then a craniotomy was performed. Sterilization was done some months later.

Splitting of the anterior wall of the uterus by the vaginal route was attempted by Esch, but had to be abandoned because of severe hemorrhage, and the patient was delivered by abdominal section.

A study of the following cases observed in the maternity of the Michael Reese Hospital, Chicago, illustrating the foregoing complication prompted this report:

REPORT OF CASES

CASE 1.—F. S., aged 35, a decipara, was admitted to the regular gynecologic service of Dr. Emil Ries, with the diagnosis of mitral stenosis, cystocele and rectocele. A Wertheim interposition of the uterus was performed under scopolamin-morphin and local anesthesia, July 28, 1916. No mention of sterilization was made in the description of the operation.

Four and a half years later the patient appeared in our prenatal clinic, having been referred from the medical division of the dispensary for pregnancy complicated by mitral stenosis. Her last menstruation was in February, 1920. She was admitted to the obstetric service of Dr. Frankenthal, Dec. 9, 1920, seven and one-half months pregnant, because of cyanosis and dyspnea and edema of the legs. She remained under observation until Jan. 28, 1921, when labor began. Examination revealed a transverse presentation of the fetus. The cervix was so high up posteriorly that it was almost inaccessible, and the anterior wall of the uterus was found to be thick and firm. No presenting part was palpable in the pelvis. Cesarean section was decided on as the only safe procedure, and I immediately operated. The uterine incision was carried longitudinally through the posterior wall to the fundus. Cornual excision of the fallopian tubes was done for sterilization. Convalescence was afebrile; the mother and baby were discharged in good condition on the twenty-third day.

CASE 2.—M. M., aged 35, a secundipara, entered the hospital with the diagnosis of a cystocele the size of an egg, a small rectocele and a retroverted uterus with an elongated cervix which prolapsed beyond the vulva. A Wertheim interposition of the uterus with enucleation of a small fibroid from the anterior wall of the fundus was performed, April 30, 1920, by a general surgeon. No mention of sterilization was made in the description of the operation. Recovery was febrile, caused by a catheter cystitis. The patient was discharged, May 30, 1920.

I first saw this patient in consultation with Dr. Ludwig Simon, Sept. 15, 1922, when in labor at full term. She entered the hospital with ruptured membranes and with a thick meconium discharge. A transverse presentation (verified by a roentgenogram) was found. The cervix, which was 4 cm. in length, was located high up near the promontory, and pointed upward and backward. The anterior wall was thick and undeveloped. The heart tones, which were recorded as being found, on admission, to be at the rate of 140 a minute, could no longer be heard. Further consultation with Drs. J. B. Baer and W. H. Rubovits was held, and the various possibilities for the termination of labor were discussed. Bag induction, followed by version, and craniotomy were suggested, since the fetus was dead. Splitting of the anterior wall of the uterus was also considered. It was finally decided to perform abdominal hysterotomy as a purely maternal indication, as any form of vaginal delivery would necessarily disturb the favorable relationships created by the original operation; furthermore, the abdominal route afforded an opportunity to sterilize the patient and thus prevent the repetition of pregnancy under these hazardous conditions. Cesarean section was performed, and a stillborn child, with the cord once about the neck, was delivered. The uterine wound was sutured with catgut in four layers. It was then obvious that the incision was in the fundus and posterior wall

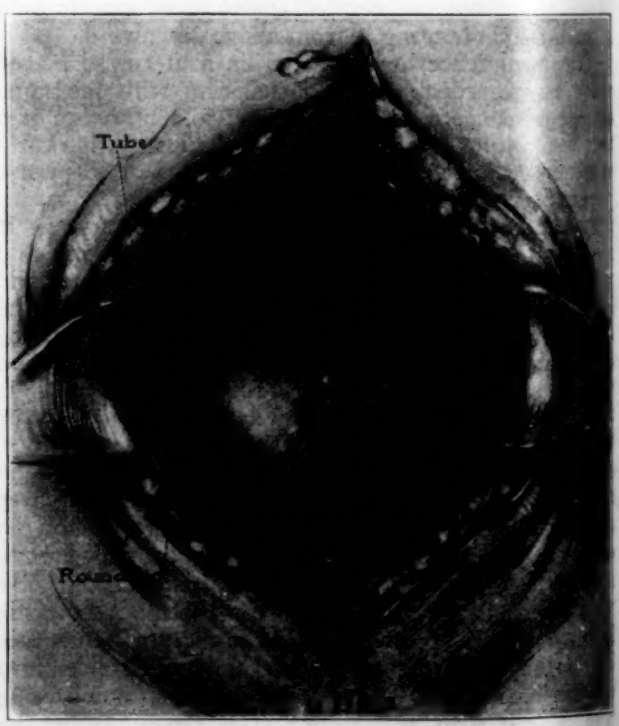

Fig. 4.—Cesarean incision in posterior wall and fundus.

of the uterus. The left tube was excised from the cornu of the uterus by a wedge-shaped incision, and the right was likewise excised and removed entirely because of a hydrosalpinx. The puerperium was afebrile, and the patient was discharged well on the twentieth day.

CASE 3.—D. S., a septipara, aged 41, was admitted to the gynecologic service of Dr. L. E. Frankenthal, Jan. 5, 1920, with a large cystocele, a dextroversion and prolapse of the uterus, and a laceration of the cervix. The interposition operation was performed, Jan. 7, 1920. No mention of sterilization appears in the description of the operation. Recovery was uneventful, and the patient was discharged on the seventeenth day. March 18, 1922, she was admitted to the hospital because of severe bladder disturbances. Her last menstruation occurred, Nov. 20, 1921, and the diagnosis of incarcerated pregnant uterus was made. An examination by Dr. Frankenthal revealed that the cervix was high up posteriorly; the anterior wall was bulging and was harder in the median line, where it was fixed to the vagina, and was consequently unchanged by the pregnancy. He predicted dystocia. The patient entered the hospital in August, 1922, in the care of Dr. W. F. Rubovits. The findings on admission were breech presentation; the cervix inaccessible vaginally, and no presenting part palpable. After a test of labor of fourteen hours, the child was delivered by abdominal cesarean section, the uterine incision passing through the fundus and posterior wall. The location of the internal os was sought after the delivery of the placenta, but could not be determined from within. Recovery was uneventful, and the mother and baby were discharged on the seventeenth day.

CASE 4.—I. K., a secundipara, aged 28, on whom an interposition for prolapse of the uterus and bladder had been performed in the service of Dr. L. E. Frankenthal, Sept. 11, 1912, with no mention of sterilization in the record of the operation, and whose recovery was uneventful, the patient being discharged on the fifteenth day, entered the maternity division, Nov. 10, 1920, in labor. A transverse presentation was found, and the cervix, which was high up, pointed upward and backward. The uterus had developed posteriorly because of the fixation of the anterior wall and the fundus. Posterior wall cesarean section was performed by Dr. Joseph L. Baer. Convalescence was afebrile, and the patient was discharged on the sixteenth day.

COMMENT

In considering the treatment of this complication of pregnancy, our reasoning was similar to that of Weibel of the Wertheim clinic, namely, that normal labor at term is out of the question. Version would entail too great a risk to both mother and child. Splitting the anterior wall of the uterus to effect delivery would endanger the favorable uterine relation created by the original operation, and carries with it the liability of severe uterine hemorrhage. Furthermore, not one of the procedures mentioned above insures against the occurrence of future pregnancy with the same serious dystocia.

Therefore, abdominal hysterotomy must be considered the only rational treatment of pregnancy after interposition of the uterus. It is highly important that an effectual sterilization be made a part of the operative procedure.

The indication for cesarean section is purely a maternal one, and therefore holds whether the child is alive and normal, or otherwise. This is the conclusion we reached in Case 2, in which the baby was dead before the operation. The midabdominal or low abdominal incision may be utilized, and the uterus incised longitudinally through the fundus and posterior wall, the latter presenting in the abdominal wound as does the anterior wall normally. This altered relationship becomes obvious after the viscus is sutured (Fig. 4), the adnexa being located low in the pelvis, just as in the nongravid condition. Sterilization should then be assured by cornual excision of the fallopian tubes and accurate approximation of the uterine serosa, or by ligation and the peritoneal screen method.

CONCLUSIONS

1. The Wertheim-Watkins operation of interposition is indicated chiefly in those cases of prolapse of the uterus or bladder in women definitely past the menopause. If it is performed during the child-bearing period, an effectual sterilization must be assured by cornual excision of the fallopian tubes or by the peritoneal screen method. Curettage as a part of the operation would insure against the development of an existing pregnancy, as occurred in one case referred to by Weibel.

2. When pregnancy occurs after interposition, abdominal cesarean section at term is the only rational and safe treatment. The operation should be supplemented by an effectual sterilization to safeguard the patient against a repetition of this serious complication.

3. The indication for section being purely a maternal one, it holds even in the event that the fetus is dead.

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ABSTRACT OF DISCUSSION

DR. ALBERT GOLDSPOHN, Chicago: I have never regarded this interposition operation as really necessary to accomplish results. It has always appeared to me as creating a greater abnormality than is needed. In view of the fact that there is still a possibility of pregnancy, although I did not surmise that it would occur as frequently as Dr. Stein reported, I have preferred the more moderate method of inversion in which the bladder is detached from the uterus and is placed on top of the fundus and not on the posterior side of the uterus; in which the long axis of the uterus is not placed approximately parallel with the long axis of the body, but at right angles approximately with the long axis of the body. The bladder is detached and the uterus is placed in position for ventral fixation, the bladder riding on top of the fundus, and a very firm ventral fixation can then be made by seizing the strong fascial structures beneath the symphysis pubis as far up as possible without interfering with the urethra. The raw surfaces made by detaching the bladder are then made available for a new fibrofibrous union which does not give way. Dr. Cullen of Baltimore last year described an operation which is almost the same as mine. The only difference is that I suture the raw edge of the peritoneum in the vesicouterine sulcus down on the posterior border of the fundus of the uterus so that it will not slide, perhaps indefinitely far, into the peritoneal cavity. This sewing down is not done by the usual interposition operation, and Dr. Cullen does not state that he does that. It may be that that is not necessary. Of course, a very important thing, just as important as this interposition of the uterus, is the restoration of a thoroughly competent, firm pelvic floor, an operation that deals actually with the levator ani muscle, better called the levator recti muscle, which, I am sorry to say, is not accomplished by many men who think they do make use of that in restoration of the pelvic floor. The actual restoration, going in far enough to get hold of the levator ani fascia and muscle and giving firm union, is an important part of the procedure. The cervix remains accessible even in case of infection.

DR. FREDERICK LOOMIS, Oakland, Calif.: I have to add as a matter of record one more case to Dr. Stein's list of pregnancies after interposition of the uterus. A woman not only became pregnant but had a placenta praevia after interposition of the uterus. Three years after this operation, she was pregnant, and showed evidence of loss of blood. The striking thing in her case was the inaccessibility of the fundus of the uterus, so that only one possible mode of delivery was left, a cesarean section, followed by a panhysterectomy on account of the density of the adhesions. When the uterus was finally removed and placed on the table right side up, there was no incision in sight, the entire incision having become inverted on the posterior wall. The patient died on the sixteenth day from sepsis. No other course was open to us, but it is interesting to know that she presented the thing

Dr. Stein emphasizes, the inaccessibility of the uterus, fundal adhesions, and the entire inversion of the incision on the posterior wall, with an unfortunate end for the patient.

Dr. Edward L. Cornell, Chicago: Dr. Stein said that some method of effectual sterilization should be employed when performing the interposition operation on patients who are in the pregnant period. I hardly think that there is an effectual sterilization procedure. Every procedure that has been employed has had failures. I have had occasion to deliver two women following sterility operations, when the tube was cut off and inserted under the peritoneum, and still the patients became pregnant; so it is my opinion that we should not operate or do the interposition operation on a woman who is not through the menopause. Pregnancy following this operation is a dangerous procedure, as Dr. Stein has said, several women having died as a result of infection following cesarean section. This, in itself, is a good and sufficient reason why we should not do the interposition operation at this period. If a patient, however, does become pregnant after an interposition operation, it does not seem advisable to perform an abortion, for the reason that the cervix in the vast majority of cases is adherent and rigid, and the danger of sepsis and rupture of the uterus is too great.

Dr. Irving F. Stein, Chicago: I disagree with Dr. Cornell when he says that an effectual sterilization operation cannot be performed. If cornual excision of the fallopian tubes is made, in the majority of women no pregnancy will occur. In a sterilization operation in which the tubes are ligated and the stumps covered by peritoneum, as described by Dr. Emil Ries, no pregnancy can occur. One other feature brought out in the third case was the bladder disturbance in early pregnancy. In one case the bladder was apparently saddled over the pregnant uterus, and severe symptoms occurred, giving rise to the diagnosis of an engorged bladder. On looking up the previous history it was found that it was simply a bladder anchored up by an interposed uterus. After rest in bed, the bladder was pushed up and the patient proceeded to term.

CINCHONA DERIVATIVES IN THE TREATMENT OF HEART DISORDERS *

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Quinin has been used in heart treatment for a long time, certainly for more than sixty years. I must confess that I have not had time in these last years to look up the history of quinin as a heart drug, but I have heard that Ludwig Traube, the most outstanding man in experimental work in connection with clinical findings, added quinin to digitalis to prevent or relieve the disagreeable action of this drug on the stomach. I do not know whether this is true or not, but it is so related. Among the older generation of clinicians there was a good number, and I knew some of them, who nearly always gave digitalis in combination with quinin. On being asked why they did it, they could not give me an exact reason for it; but they found that digitalis was better supported with quinin and that they could give larger doses without getting disagreeable symptoms. One of them said that not only he but also his patients were very much satisfied with this form of treatment, so why should he not give this combination?

My objection to quinin in heart disease was that it had been shown by Santesson and by Stokvis to be a heart-paralyzing drug. Digitalis in toxic doses brings the heart to a standstill in systole; large doses of quinin, however, bring the heart to a standstill in diastole, and in smaller doses lead to a definite depression of the strength of the heart beat. This was the reason I did not wish to give quinin in cases of heart failure or any other bad condition of the heart. There I was wrong. We can never tell from the pharmacologic action of the drug how it will work at the bedside; for instance, we should never forget that the action of digitalis also on the heart is mainly and primarily a depressing action on the functions of heart muscles, at least as far as its vagus action is concerned, and still digitalis is the most powerful and most brilliant of all heart drugs. That we should not avoid giving drugs that have been found to be useful at the bedside on account of theoretical arguments only is shown in the following case:

In 1912, a patient presented himself in my office wishing to get rid of his attacks of auricular fibrillation. He knew that this was the so-called perpetual or complete arrhythmia and that his attacks ceased for the most part spontaneously after from two to fourteen days. He was a stout man, aged about 50, able to do a good deal of bodily exercise and even during the attack to walk for four or five hours. From this fact it was clear that the efficiency of his heart and circulation was only slightly diminished by the attack. He did not feel great discomfort during the attack but, as he said, being a Dutch merchant, used to good order in his affairs, he would like to have good order in his heart business also and asked why there were heart specialists if they could not abolish this very disagreeable phenomenon. On my telling him that I could promise him nothing, he told me that he knew himself how to get rid of his attacks, and as I did not believe him he promised to come back the next morning with a regular pulse, and he did. It happens that quinin in many countries, especially in countries where there is a good deal of malaria, is a sort of drug for everything, just as one takes acetylsalicylic acid today if one does not feel well or is afraid of having taken cold. Occasionally, taking the drug during an attack of fibrillation, the patient found that the attack was stopped within from twenty to twenty-five minutes, and later he found that a gram of quinin regularly abolished his irregularity.

I was greatly struck by this fact, and afterward tried this sort of treatment in many cases of auricular fibrillation. My success was disappointing, in that quinin abolished auricular fibrillation in only a few cases and in those cases only when the onset of this form was quite recent, never when it was of several years' duration. At the same time, I found that even in those cases in which auricular fibrillation was not abolished, the drug had a marked soothing action on the often terrific rate of the ventricle. I received the impression that here the depressing, paralyzing action of the drug had a very favorable effect on the hyperactivity (hyperkinesis) of the heart. This made me try this form of treatment in other forms of arrhythmia due to some form of hyperkinesis also.

The first arrhythmia in which I had complete success with small doses of quinin (from 0.3 to 0.4 gm.) was extrasystole. It is well known that until that time we had no generally satisfying drug or method of treatment of this very common and innocuous, but at the same time very disagreeable, form of arrhythmia. For over fifty years I had been trying all of the drugs from

* Read before the Section on Practice of Medicine at the Seventy-Fourth Annual Session of the American Medical Association, San Francisco, June, 1923.

which one might expect to have a quieting influence on the heart. Apart from digitalis in very small doses, which may work wonderfully in some exceptional cases, there was only one drug which, I found unexpectedly, had a good influence on some of my patients, viz., strychnin. The first case which gave me proof of this favorable action of strychnin on extrasystole was that of a man with a very serious insufficiency of the aortic valves. His heart was in a very bad condition, and the man knew that he had only a short time to live. He bore his condition very well, but there was one thing which made life unendurable to him, namely, periods of extrasystole. The extraordinarily strong pulse wave, following the compensatory pause of the extrasystole, made him feel so utterly miserable that he asked energetically for relief. I gave him strychnin, which has been given in other countries for many years in cases of heart failure. In doses of from 2 to 3 mg. daily, this drug helped him as soon as extrasystole came on, and the favorable effect was not lost until the end. I have found strychnin in these small doses helpful in cases of extrasystole in otherwise normal as well as in diseased hearts, but very often it did not act strongly enough, or it lost its action very soon. In these last cases I tried the combination of quinin and strychnin and found that this form of treatment had complete success in the great majority of my cases. I have given from 0.3 to 0.4 gm. of quinin daily, plus 2 or 3 mg. of strychnin through periods of ten days. My experience with this treatment since the year 1915 has been so favorable that I am convinced that whoever will try it will come to the same conclusion.

After seeing this favorable effect, I thought it wise to try quinin in other forms of hyperactivity of the heart. Quinin being a depressing drug, we have to be very careful in cases of damaged heart muscle or real heart failure; we should never imagine that quinin could be a heart stimulant. Keeping this in mind, I have found that quinin treatment has its greatest use in conditions in which an abnormal rhythm starts in the auricle or the atrioventricular node, or the ventricle interferes with the normal pacemaker of the heart. I have found it useful in all different forms of extrasystole; and, to some extent, in the different forms of paroxysmal tachycardia, but also in cases of marked so-called sinus arrhythmia starting in the normal pacemaker itself, quinin may act beneficially. In those forms of tachycardia, especially, found so frequently in adolescence, in nervous, rapidly grown-up young people, quinin, especially in combination with strychnin with its marked vasomotor influence, may be of great help. This is of the greater importance, because these tachycardias, certainly of central nervous origin, are very difficult to treat successfully. Long administration of small doses of digitalis sometimes has a favorable effect, but not at all in a really satisfactory way. The combination of quinin and strychnin stabilizes the heart action so quickly, and the young patients are themselves so much relieved, that after a short time it was possible to start the most important and causative treatment, viz., mental and muscular training.

Favorable effects may be seen in other typical hyperactivity of the heart: In exophthalmic goiter and other forms of hyperthyroidism, not only does the heart beat too quickly, but also the energy of every systole is much increased, as if under the influence of constant stimulation of the accelerator nerves. Quinin in doses of from 0.4 to 0.5 gm. has a decidedly quieting influence on the heart quite apart from whether there is auricular fibrillation or not. The patient himself is the first to notice this favorable effect.

In view of all these beneficial effects, it was to be wondered that quinin was active in so few cases of auricular fibrillation. Here Walter Frey's experiments were illuminating. Trying out the different derivatives of cinchona, he found that quinidin is much more powerful in abolishing auricular fibrillation than quinin. The difference between the two seems to be merely quantitative. We found that by giving much larger doses of quinin we could get the same effect as by giving smaller doses of quinidin; but, on the other hand, in some cases of long-standing periods of extrasystole, quinidin had the full effect where quinin had been given for a long time without giving more than slight relief. Certainly, the introduction of quinidin as a form of quinin treatment has proved to be of the greatest advantage. The "dramatic" transition of long-standing complete arrhythmia into a perfectly normal mechanism of the heart has made a great impression on physicians over all of the world and made, at least, this form of quinin treatment quite popular.

Summarizing my own experience and the work done by others, I may say that quinidin has its greatest success in those cases in which there is not much wrong with the heart, in which fibrillation has been present for not too long a time or is showing itself in attacks as a special form of paroxysmal tachycardia. When auricular fibrillation is the only abnormal phenomenon of the heart, the disappearance of this disagreeable form of disturbance of the heart mechanism may be a complete cure, freeing the patient not only from his subjective symptoms but at the same time of the suspicion of having a myocarditis, or, at least, of some bad condition of the heart muscles. On the other hand, in cases in which fibrillation is only a part of the morbid condition, when valvular disease or pathologic changes in the heart muscle are the chief features of the disease, the abolishing of fibrillation will give only partial relief. In such cases we should never forget that all cinchona derivatives are depressing drugs and should not be given in too large quantities. Generally speaking, real heart failure asks for digitalis, and it may be necessary to avoid quinidin until the condition of the heart is much better. I, myself, am giving the combination of digitalis and quinin from the very beginning, especially when there is a very rapid and irregular action of the heart, doing, as a matter of fact, what old clinicians did a great many years ago. To avoid an unfavorable effect of quinidin, one should try to find out whether auricular fibrillation plays an important rôle in the development of the disturbance of the circulation; with a slow ventricular rate there will not be much use for quinidin, and when there is a dangerous condition of heart muscle failure it may even do harm. Limiting quinidin treatment to cases in which fibrillation is a real factor of importance or the only symptom, one may see many beautiful cures and avoid the accidents mentioned in the literature. Certainly the last word in this important therapeutic matter has not been spoken, and careful observation of every patient under treatment will be necessary before we shall know all we wish to know about quinidin treatment in auricular fibrillation.

The great impression that quinidin treatment made on the medical profession is certainly due to the fact

that its favorable effect shows itself suddenly by the transition of long-standing irregularity into normal rhythm after the administration of the drug. It is this sudden effect that gives absolute proof of its activity. Would it not be possible to get the same form of convincing proof for the action of quinin in those other forms of irregularity of which I have been speaking rather enthusiastically? This proof has been provided by Winterberg. He found in my clinic that intravenous injection of quinin (not quinidin) may stop an attack of paroxysmal tachycardia in many cases, and sometimes so quickly that he had to keep his electrocardiograph running in order not to miss the interesting moment of transition from the pathologic to the normal rhythm. In a few specimens of tracings which I am able to show, the sudden stopping of the attack was obtained by the injection of not more than 0.5 or 0.75 gm. of quinin, a dose perfectly supported by all our patients and much smaller than the doses injected intravenously in cases of long-standing or severe tropical malaria. The patient himself has the curious sensation of a heat wave passing through his body, and no other disagreeable effect; only rarely did we have to deal with depressing actions of quinin on the tonus of the vessel wall, showing itself in a fall of blood pressure and sometimes in syncope, easily relieved by some stimulants. The same favorable effects of the intravenous injection are shown in one of these tracings from a case of extrasystoles coming on in long series, that resisted quinin treatment by mouth, so that proof of the favorable action of quinin on extrasystole, so evident but not showing itself so immediately in treatment by mouth, is given in a way absolutely equal to any form of experiment.

It would take too much time if I should try to deal broadly and deeply with the question of the analysis of the action of quinin on the heart muscle. This question requires a great deal more experimental work: certainly, it is not sufficient to say simply that quinin lengthens the refractory period of the heart. We must investigate the effect of quinidin on every single function of the heart muscle and distinguish between its primary and its secondary effect in the way Engelmann taught us. What this means may be exemplified by the well-known fact that digitalis, which lengthens the conduction time, may have a favorable effect even in cases in which there is a lack of conductivity. This favorable effect is due to the fact that digitalis at the same time both slows the heart and provides it with a longer time for restoring its various functions.

Before leaving this subject I want to say a few words about another influence of quinin bodies which may prove useful in the treatment of cardiovascular conditions: the syncope just mentioned is generally and probably rightly ascribed to vasodilatation, not so much to depressing action on the heart. Some clinical observations have shown that in so-called vascular crises (sudden spasm, i. e., hyperkinesis of the walls of the smaller arteries) quinin may stop the spasm and so relieve the patient of his symptoms. Winterberg found that, in some cases of anginal pain accompanied by sudden and very important rise of blood pressure, intravenous injections of 0.5 gm. of quinin may stop the attack at once and completely so that not only the pain but also the enormous rise in blood pressure is abolished. Winterberg has described the details of this interesting case. I simply want to point out that the problem of quinin in the treatment of heart disease and cardiovascular conditions covers a much larger area than the question of quinidin and auricular fibrillation only, and that the action of this drug on the arterial system and its rôle played on the circulation in general should be studied carefully.

That quinin must be of the greatest importance in the treatment of such conditions has been perfectly known to the old clinicians. The Viennese clinician Oppolzer, in his lectures on the treatment of internal diseases (1872), begins his chapter on the treatment of heart diseases with the words: "The best and most powerful factors in dealing with heart patients are three: rest, digitalis and quinin." Curiously enough, all of us had forgotten about quinin. Certainly, we did not know exactly in which cases it should be given, and we had insufficient experimental evidence about its action only, viz., that it is a heart-paralyzing drug. I, myself, avoided quinin only on this theoretical reasoning. The facts now known teach us that certainly the last word in therapeutics has to be said at the bedside—but, at the same time, that experimental evidence and careful analysis of the action of the drug will give us a clearer insight into the important question, in which cases it should be avoided. I think all will see that the reintroduction of quinin into therapeutics not only is an important acquisition in the treatment of heart disease but at the same time gives us a useful and beautiful instance of the cooperation of clinical and experimental investigation.

THE TREATMENT OF ACUTE POLIOMYELITIS

PRELIMINARY NOTE ON USE OF HYPERTONIC SALT SOLUTION AND CONVALESCENT HUMAN SERUM*

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The results in general of the serum treatment of acute poliomyelitis have not been sufficiently consistent to warrant a definite statement as to its value. In the absence of hyperimmune serum, recourse must be had to human convalescent serum, which is at best weak in its antibody content. In a small series,[1] the administration of large doses of convalescent serum a few hours after onset yielded distinctly encouraging results, but it is agreed that the problem has not been solved. Such treatment is beset with obstacles apparently insurmountable, one of the greatest of which is the inaccessibility of the site of injury in poliomyelitic infection.

Since the flow of fluid within the nervous tissue itself is probably from the capillaries along the pericapillary, perineuronal and perivascular spaces toward the subarachnoid space, serum injected merely into the subarachnoid sac cannot be expected to reach the inflammatory focus lying deep in the gray matter of the cord. It is likewise true that the walls of the capillaries of the nervous tissue constitute an effective barrier against the passage of serum from the circulation

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1. Amoss, H. L., and Chesney, A. M.: J. Exper. Med. 25:581 (April) 1917.

to the perivascular system.[2] Weed and his co-workers[3] have shown that the intravenous injection of hypertonic solutions in normal animals causes a reduction in the volume of the brain and spinal cord with a marked lowering of the cerebrospinal fluid pressure and an aspiration of fluid from the subarachnoid space into the perivascular "lymph" spaces of the brain and cord.

In our experiments,[4] similar results have been obtained in the edematous cords of monkeys in the acute stage of poliomyelitis, and have led to the employment of the method in the treatment of the experimental disease. Poliomyelitic monkeys given convalescent human serum intraspinally and intravenously, and hypertonic salt solution intravenously, exhibited marked improvement as compared to controls. By the shrinking of the central nervous tissues after intravenous injection of hypertonic salt solution, more space is available in the subarachnoid space for the reception of large amounts of serum; this is especially advantageous, since the convalescent serum is at best weak in antibody content, and correspondingly larger amounts must be injected. The beneficent effect of the change in tonicity of the blood, with the marked decrease in the volume of the brain and spinal cord, is to reduce the inflammatory edema of the cord. However, it seems that edema cannot be explained entirely on the basis of osmosis. Our experiments have not progressed sufficiently to warrant any statement on this point.

The third and probably the main possibility of a beneficent effect of such a method lies in the fact that the intravenous injection of hypertonic solution brings about an aspiration of serum from the subarachnoid space into the perivascular system, thus insuring a more intimate contact between the main lesions of poliomyelitis and the serum, which can be regarded as a distinct advantage in local specific therapy. There is one other possibility in connection with the employment of this method. It is possible to administer enough hypertonic solution, approximately 1 gm. of sodium chlorid per kilogram of body weight, to cause cerebrospinal fluid pressure to fall from 80-120 mm. of water to −90 mm. of water without damage. This loss of fluid within the central nervous system is replaced afterward by an increased passage of fluid from the blood stream to the cerebrospinal fluid, normal pressure being reestablished within a few hours. On the hypothesis that this increased flow of fluid would facilitate the passage of serum from the circulation to the fluid spaces of the central nervous tissue, the intravenous injection of immune serum one or two hours after the injection of hypertonic solution is recommended.

REPORT OF CASE

Opportunity for the application of this method to cases in human beings has not yet been afforded except in one instance. It is realized that, without data from many cases, no conclusions can be drawn; yet, owing to the demand for details of the method a brief report of one case is given.

History.—G. E. I., a boy, aged 4 years, with normal development, and past history unimportant, entered Harriet Lane Home[5] of the Johns Hopkins Hospital, Jan. 16, 1923, for treatment for acute abdominal pain and sudden loss of power to move the arms and legs, closely following a gastro-intestinal upset. The onset occurred January 8, with repeated chills and fever, which endured for two days. On the fourth day, the symptoms disappeared, and the patient remained asymptomatic until the morning of January 15, when he told his mother that he could not "wiggle his toes." The weakness of the legs noticed at that time gradually increased until motion was lost. Tingling in the fingers appeared, and there was a rapid loss of motor function of the arms and trunk. On admission, the temperature was 100.4 F., the respirations, 40, and the pulse, 120. The patient was mentally clear and cooperative. The extremities were flaccid, with perhaps slight power in the right arm and leg. The patient was unable to move in bed. Speech was normal.

Examination.—The head, eyes, ears, sinuses, nose, throat and mouth were normal. There was no glandular enlargement; the chest, heart, lungs, abdomen, genitalia and joints were normal. The extremities were flaccid, as already described.

The tendon reflexes of the upper and lower extremities could not be obtained; the abdominal reflexes were hyperactive. There was no clonus, and no Babinski's sign on either side; Kernig's sign was negative. There was no abnormality of the cranial nerves, and no disturbances of sensation. Flexion of the neck and back produced pain.

Urine examination was negative. Blood examination revealed: red blood cells, 5,288,000 (cells normal); white blood cells, 19,500. Spinal fluid withdrawn at 7:30 p. m., January 16, was clear and under normal tension; there were 40 cells, mostly mononuclear, and the globulin test was negative; the Wassermann reaction was negative. An intracutaneous injection of 0.1 mg. of tuberculin gave a positive reaction. A roentgenogram of the chest showed no abnormality.

Course and Treatment.—At noon, January 17, it was noticed that the facial muscles on the right side, and intercostal muscles on both sides were weak. Both anterior and posterior deltoid muscles on the left side were completely paralyzed, and all the muscles of the right arm were weaker than normal. The right leg was now completely paralyzed.

It seemed entirely reasonable to suppose that this was a case of acute poliomyelitis of Landry's type, and the subsequent course substantiates this view.

On the basis of results obtained in the treatment of experimental poliomyelitis in monkeys, treatment with intravenous hypertonic solution and convalescent human serum was begun.

January 17, at 8 p. m., lumbar puncture was performed; 35 c.c. of clear spinal fluid was removed, and human convalescent poliomyelitic serum allowed to flow in until equilibrium was established with a head of 4 inches. It was estimated that 20 c.c. of serum flowed into the subarachnoid space. While the needle and connections remained in place, there was injected, intravenously under ether anesthesia, 25 c.c. of concentrated Ringer's solution, of which the sodium chlorid content was 18 per cent. Within two minutes, the serum began to flow again into the spinal canal at a fairly rapid rate. After 20 c.c. of serum had been allowed to flow in, there was no apparent decrease in the rate of flow, and the needle was withdrawn. Since there was already obvious involvement of the respiratory center, the injections were made with dispatch, and no manometric readings were made.

During the night, the patient was very thirsty; a small amount of crushed ice was allowed, but water was withheld. By 1 o'clock that night, the rectal temperature reached 104.4. There were two short convulsions and convulsive movements of the back muscles. Fluids were given by mouth, and the temperature was reduced to 102. The patient was very restless.

January 18, at 10 a. m., lumbar puncture was again performed. The fluid obtained was turbid, with 18,000 cells per cubic millimeter, most of them polymorphonuclear. The temperature became normal at 7 p. m. The white blood cell

2. Mott, F. W.: Lancet **2**:79, 1910. Flexner, Simon: The Local Specific Therapy of Infections, J. A. M. A. **61**:447 (Aug. 16) 1913. Flexner, Simon, and Amoss, H. L.: J. Exper. Med. **25**:499 (April) 1917.

3. Weed, L. H.: J. M. Res. N. S. **26**:93, 1914. Weed, L. H., and Hughson, Walter: Am. J. Physiol. **58**:53, 101 (Nov.) 1921. Weed, L. H., and McKibben, P. S.: Ibid. **48**:531, 1919. Weed, L. H.: Am. J. Anat. **31**:191 (Jan.) 1923.

4. These will be reported in the Bulletin of the Johns Hopkins Hospital, December, 1923.

5. The patient was under the care of Dr. W. J. Scott, from whose notes this abstract was taken.

count was 25,000. At 10 p. m., the diaphragm was weaker, and the abdominal muscles were being used more than usual.

January 19, at 9 a. m., the patient seemed better. Five per cent. glucose solution by rectum was not retained. Fluids were given by mouth in small amounts. The patient could swallow, but seemed unable to cough. The chest was clear, and the respiratory rate was from 26 to 30 a minute.

January 20, respirations were improved, and the patient seemed brighter. He complained at times of pains in the legs.

January 21, the patient seemed very bright, and the facial weakness had almost disappeared.

January 22, he was breathing with less difficulty. There were four loose, involuntary stools.

January 23, there were no more involuntary stools, and the patient voided normally. He was hungry for the first time. Breathing was improved, but there was still a noticeable weakness of the diaphragm.

January 25, there was a return of the inability to move the fingers and toes.

January 27, there was improvement in the muscles of the shoulder.

January 28, the muscles of the arm were stronger.

January 30, the patient moved the fingers of both hands for the first time, the right better than the left. Neither thumb functioned. The triceps muscle on the right functioned. The left arm was flaccid, but could be moved slightly with effort. There was slight power in the right biceps, and none in the left.

February 1, there was slight voluntary contraction of both adductors.

February 3, the diaphragm and intercostal muscles were definitely stronger.

February 4, there was a slight return of power in the left triceps muscle; the right was stronger.

February 10, there was definite improvement of the muscles previously mentioned.

February 23, there were movements in the right leg.

The patient continued to improve, and was discharged, March 29. Monthly observations have revealed a steady improvement and excellent restoration of function of the muscles of the upper extremities. The patient was seen last, June 14. At that time there was still some weakness of grip in the left hand, and slight weakness of the posterior deltoid on the right, but he was able to raise both arms above his head, to flex his thighs on his abdomen, turn over in bed and sit up. There was slight motion in the toes of the right foot —none in the left.

COMMENT AND SUMMARY

The story, taken as a whole, conforms well to the type of Landry's paralysis seen in epidemics, but unusual in sporadic cases of poliomyelitis. In such a case presenting first paralysis of the extremities rapidly extending and finally developing respiratory paralysis, the prognosis was very grave, and it was because of the apparent hopeless outlook that a method of treatment not yet fully developed and hitherto employed only in experimental poliomyelitis was applied.

Whether the intravenous injection of hypertonic salt solution stayed or slightly cleared the edema of the cord, or brought the convalescent human serum nearer the site of the inflammation, or only made it possible to inject more serum intraspinally without danger of pressure, is not yet clear.

This case is described in order to present details of the method of the treatment, and no claim whatever is made that the patient was benefited by the injections. Apparently no harm was done by the procedure.

On account of the limited amount of serum on hand, the intravenous injection of 100 c.c. of convalescent human serum after the administration of hypertonic salt solution was omitted. This plan is recommended on the basis of experiments to be described in a forthcoming paper. In these experiments, it was found that, while no especial difficulty was encountered in initial injections of hypertonic solutions, daily repetition of the injection in poliomyelitic monkeys caused respiratory failure sometimes after comparatively small amounts of hypertonic solution had been injected. Hence, repeated injections cannot be recommended.

Clinical Notes, Suggestions, and New Instruments

STAB WOUND INTO THE LEFT VENTRICLE OF THE HEART

JOHN F. X. JONES, M.D., PHILADELPHIA

About seven years ago I sutured successfully a stab wound which opened into the left ventricle of the heart.[1] The patient is alive and well today.

REPORT OF RECENT FATAL CASE

History.—At 2:30 p. m., May 20, 1923, a well developed negro, aged 33, was admitted to St. Joseph's Hospital. He had been stabbed in the left side of the chest by "a long, slender knife." The wound had been inflicted about thirty minutes before his arrival at the hospital.

On the left side of the anterior wall of the thorax, in the sixth intercostal space, close to the sternum, there was a small, circular wound. Bright red blood trickled from this opening. There was an old scar on the right side of the anterior chest wall. The heart sounds were weak and irregular, and a bruit was heard in the mitral area. The patient's pulse was rapid, irregular and of low tension. He was conscious.

The field of operation having been shaved, and painted with iodin, an osteoplastic flap was turned down at 3:10 p. m., or one hour and ten minutes after the infliction of the wound. The fifth, sixth and seventh ribs contributed to the formation of the flap. The hinge of the flap was central, or at the costosternal junction. The left pleura had been punctured; the left lung was collapsed. The heart beat feebly. An opening in the pericardium was enlarged by means of scissors, and large quantities of both clotted and liquid blood escaped. The heart action then became violent. A wound, about one-third inch in diameter, near the apex of the heart and extending into the left ventricle, was closed by means of two interrupted, chromicized, catgut sutures (No. 1). While the pericardium was being sutured, the patient ceased to breathe.

Necropsy (by Dr. W. S. Wadsworth).—The knife entered the chest, in the sixth left interspace, parallel and lateral to the sternum. An osteoplastic flap was made from the fifth, sixth and seventh ribs with the costosternal cartilage. The left pleura was punctured; the left lung was collapsed. The right pleura was bound down by adhesions. With the collapse of the left lung, the right lung attempted to compensate, but was unable to do so on account of adhesions. The pericardium was closed with a continuous catgut suture; it contained a small amount of blood. The wound in the left ventricle was believed to be about one-third inch in diameter, and had contracted down to one-fourth inch. This wound was closed with two interrupted catgut sutures.

COMMENT

As recently as 1919, DaCosta[2] has reviewed the writings of those most prominently associated with the surgery of the heart, and has cited the names of those who have compiled cases of heart injury. Having considered the results of many operations by various surgeons, DaCosta believes that the mortality of heart wounds which are not operated on will be at least as high as 90 per cent., and that cases in which operation is performed will show a mortality between 60 and 70 per cent. He writes: "There have been thirteen cases of heart suture in Philadelphia and six recoveries." The case reported here makes the total fourteen. Of course, there may be unreported cases.

1. Jones, J. F. X.: Ann. Surg. **65**: 120 (Jan.) 1917.
2. Da Costa, J. C.: Modern Surgery, Ed. 8, Philadelphia, W. B. Saunders Company, 1919, p. 459.

Ballance[3] has compiled 152 cases of operation for injury of the pericardium and heart published since Pool's[4] collection.

New and Nonofficial Remedies

THE FOLLOWING ADDITIONAL ARTICLES HAVE BEEN ACCEPTED AS CONFORMING TO THE RULES OF THE COUNCIL ON PHARMACY AND CHEMISTRY OF THE AMERICAN MEDICAL ASSOCIATION FOR ADMISSION TO NEW AND NONOFFICIAL REMEDIES. A COPY OF THE RULES ON WHICH THE COUNCIL BASES ITS ACTION WILL BE SENT ON APPLICATION. W. A. PUCKNER, SECRETARY.

PROTEIN EXTRACTS DIAGNOSTIC-P. D. & CO.—Protein extracts in the form of paste, the base of which is a mixture of glycerin and powdered boric acid. One part represents one part of original material.

Actions and Uses.—See Pollen and Epidermal Preparations and Biologically Reactive Food Proteins, New and Nonofficial Remedies, 1923, p. 234.

Dosage.—See Pollen and Epidermal Preparations and Biologically Reactive Food Proteins, New and Nonofficial Remedies, 1923, p. 234.

Protein Extracts Diagnostic-P. D. & Co. are marketed in collapsible tubes containing approximately 1.5 Gm., sufficient for fifty tests.

Manufactured by Parke, Davis & Co., Detroit. No U. S. patent or trademark.

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D. & Co.*; Carrot Protein Extract Diagnostic-P. D. & Co.*; Cat Hair Protein Extract Diagnostic-P. D. & Co.§; Cattle Hair Protein Extract Diagnostic-P. D. & Co.§; Celery Protein Extract Diagnostic-P. D. & Co.*; Cheese Protein Extract Diagnostic-P. D. & Co.*; Cherry Protein Extract Diagnostic-P. D. & Co.*; Chestnut Protein Extract Diagnostic-P. D. & Co.*; Chicken Protein Extract Diagnostic-P. D. & Co.*; Chicken Feathers Protein Extract Diagnostic-P. D. & Co.§; Clam Protein Extract Diagnostic-P. D. & Co.*; Cocoa Protein Extract Diagnostic-P. D. & Co.*; Codfish Protein Extract Diagnostic-P. D. & Co.*; Coffee Protein Extract Diagnostic-P. D. & Co.*; Corn Protein Extract Diagnostic-P. D. & Co.*; Crab Protein Extract Diagnostic-P. D. & Co.*; Cucumber Protein Extract Diagnostic-P. D. & Co.*; Dog Hair Protein Extract Diagnostic-P. D. & Co.§; Duck Protein Extract Diagnostic-P. D. & Co.*; Duck Feathers Protein Extract Diagnostic-P. D. & Co.§; Egg (all proteins) Protein Extract Diagnostic-P. D. & Co.*; Egg White Protein Extract Diagnostic-P. D. & Co.*; Egg Yolk Protein Extract Diagnostic-P. D. & Co.*; Eggplant Protein Extract Diagnostic-P. D. & Co.*; English Walnut Protein Extract Diagnostic-P. D. & Co.*; Fig Protein Extract Diagnostic-P. D. & Co.*; Garlic Protein Extract Diagnostic-P. D. & Co.*; Ginger Protein Extract Diagnostic-P. D. & Co.*; Goose Protein Extract Diagnostic-P. D. & Co.*; Goose Feathers Protein Diagnostic-P. D. & Co.§; Grapefruit Protein Extract Diagnostic-P. D. & Co.*; Guinea-hen Protein Extract Diagnostic-P. D. & Co.*; Guinea Pig Hair Protein Extract Diagnostic-P. D. & Co.§; Haddock Protein Extract Diagnostic-P. D. & Co.*; Halibut Protein Extract Diagnostic-P. D. & Co.*; Herring Protein Extract Diagnostic-P. D. & Co.*; Hickory Nut Protein Extract Diagnostic-P. D. & Co.*; Horse Hair Protein Extract Diagnostic-P. D. & Co.§; Horse Serum Protein Extract Diagnostic-P. D. & Co.†; Juniper Pollen Protein Extract Diagnostic-P. D. & Co.‡; Lamb Protein Extract Diagnostic-P. D. & Co.*; Lemon Protein Extract Diagnostic-P. D. & Co.*; Lettuce Protein Extract Diagnostic-P. D. & Co.*; Lobster Protein Extract Diagnostic-P. D. & Co.*; Mackerel Protein Extract Diagnostic-P. D. & Co.*; Milk (Cow's) (all proteins) Protein Extract Diagnostic-P. D. & Co.*; Milk (Human) Protein Extract Diagnostic-P. D. & Co.*; Mugwort (wormwood) Pollen Protein Extract Diagnostic-P. D. & Co.‡; Mustard Protein Extract Diagnostic-P. D. & Co.*; Mutton Protein Extract Diagnostic-P. D. & Co.*; Oat Pollen Protein Extract Diagnostic-P. D. & Co.‡; Orris Root Protein Extract Diagnostic-P. D. & Co.*; Oatmeal Protein Extract Diagnostic-P. D. & Co.*; Onion Protein Extract Diagnostic-P. D. & Co.*; Orange Protein Extract Diagnostic-P. D. & Co.*; Oyster Protein Extract Diagnostic-P. D. & Co.*; Parsnip Protein Extract Diagnostic-P. D. & Co.*; Pea Protein Extract Diagnostic-P. D. & Co.*; Peach Protein Extract Diagnostic-P. D. & Co.*; Peanut Protein Extract Diagnostic-P. D. & Co.*; Pear Protein Extract Diagnostic-P. D. & Co.*; Pecan Protein Extract Diagnostic-P. D. & Co.*; Pepper (Sweet) Protein Extract Diagnostic-P. D. & Co.*; Perch Protein Extract Diagnostic-P. D. & Co.*; Pike Protein Extract Diagnostic-P. D. & Co.*; Pineapple Protein Extract Diagnostic-P. D. & Co.*; Paprika Protein Extract Diagnostic-P. D. & Co.*; Plum Protein Extract Diagnostic-P. D. & Co.*; Pork Protein Extract Diagnostic-P. D. & Co.*; Prune Protein Extract Diagnostic-P. D. & Co.*; Potato (Sweet) Protein Extract Diagnostic-P. D. & Co.*; Potato (White) Protein Extract Diagnostic-P. D. & Co.*; Pumpkin Protein Extract Diagnostic-P. D. & Co.*; Rabbit Hair Protein Extract Diagnostic-P. D. & Co.§; Radish Protein Extract Diagnostic-P. D. & Co.*; Ragweed Pollen Protein Extract Diagnostic-P. D. & Co.‡; Raspberry Protein Extract Diagnostic-P. D. & Co.*; Red Pepper Protein Extract Diagnostic-P. D. & Co.*; Redtop Pollen Protein Extract Diagnostic-P. D. & Co.‡; Rhubarb Protein Extract Diagnostic-P. D. & Co.*; Rice Protein Extract Diagnostic-P. D. & Co.*; Russian Thistle Pollen Protein Extract Diagnostic-P. D. & Co.‡; Rye Protein Extract Diagnostic-P. D. & Co.*; Rye Pollen Protein Extract Diagnostic-P. D. & Co.‡; Sage Protein Extract Diagnostic-P. D. & Co.*; Salmon Protein Extract Diagnostic-P. D. & Co.*; Scallop Protein Extract Diagnostic-P. D. & Co.*; Shad Protein Extract Diagnostic-P. D. & Co.*; Sheep Wool Protein Extract Diagnostic-P. D. & Co.§; Shrimp Protein Extract Diagnostic-P. D. & Co.*; Smelt Protein Extract Diagnostic-P. D. & Co.*; Sole Protein Extract Diagnostic-P. D. & Co.*; Spinach Protein Extract Diagnostic-P. D. & Co.*; Squab Protein Extract Diagnostic-P. D. & Co.*; Squash Protein Extract Diagnostic-P. D. & Co.*; Strawberry Protein Extract Diagnostic-P. D. & Co.*; Tea Protein Extract Diagnostic-P. D. & Co.*; Timothy Pollen Protein Extract Diagnostic-P. 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Products marked * are prepared by the following method: The material is finely ground and mixed with four times its weight of sterile water containing 0.1 per cent. of a phenolic preparation having a phenol coefficient of from 12 to 24 and shaken in a mechanical shaker for 24 hours. The mixture is then strained and filtered, and to the filtrate glycerin is added in the proportion of 2 Gm. for every 5 Gm. of original material and the water evaporated in a vacuum at 37 C. The glycerin extract is then mixed with powdered boric acid in the proportion of 2 parts of glycerin extract to 3 parts of boric acid. The finished amount of paste is equal to the weight of material taken.

Products marked † are prepared by the following method: Serum is mixed with glycerin in the proportion of 5 parts of serum to 2 parts of glycerin. The water in the mixture is evaporated in a vacuum at 37 C. The glycerin extract is then mixed with powdered boric acid in the proportion of 2 parts of glycerin extract to 3 parts of boric acid. The final amount of paste is the same as the weight of serum originally taken.

Products marked ‡ are prepared by the following method: Dry pollen is extracted with physiologic solution of sodium chloride containing 0.05 per cent. of a phenolic preparation having a phenol coefficient of 12 to 24 in the proportion of 1 Gm. pollen to 5 Cc. of menstruum, the mixture being ground in a ball mill for several days with sterile sand. After removal from the mill, the mixture is diluted with three times its volume of the solvent and shaken in a mechanical shaker for twenty-four hours. The mixture is filtered and glycerin added in the proportion of 2 Gm. for every 5 Gm. of pollen. Water is evaporated in a vacuum at 37 C. The extract is mixed with powdered boric acid in the proportion of 2 parts glycerin extract to 3 parts of boric acid. The final weight of the mixture is equal to the weight of the pollen taken.

Products marked § are prepared by the following method: The material (hair or feathers) is finely ground and mixed in the proportion of 125 Gm. and 2,000 Cc. 14 per cent. alcohol and agitated in a mechanical shaker for twenty-four hours. The mixture is then strained and filtered and glycerin added to the filtrate in the proportion of 2 Gm. for every 5 Gm. of original material and then the water evaporated in a vacuum at 37 C. The glycerin extract is then mixed with powdered boric acid in the proportion of two parts of glycerin extract with three parts of boric acid. The finished amount of preparation is equal to the weight of original material taken.

GROUP PROTEIN EXTRACTS DIAGNOSTIC-P. D. & CO.—A mixture in equal proportions of two or more Protein Extracts Diagnostic-P. D. & Co.

Actions and Uses.—See Protein Mixtures for Diagnosis (J. A. M. A., Aug. 4, 1923, p. 393).

Dosage.—See Protein Mixtures for Diagnosis (J. A. M. A., Aug. 4, 1923, p. 393).

Group Protein Extracts Diagnostic-P. D. & Co. are marketed in collapsible tubes containing approximately 1.5 Gm., sufficient for fifty tests.

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3. Ballance, C. A.: The Bradshaw Lecture on the Surgery of the Heart, New York, J. B. Macmillan Company, 1920.
4. Pool: Ann. Surg. **55**: 485, 1912.

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SATURDAY, AUGUST 11, 1923

THE OCCURRENCE OF ARSENIC IN THE BODY

Somewhat less than a quarter of a century ago, the French chemist Gautier aroused considerable discussion in scientific circles by his communication to the Académie des Sciences of Paris on the occurrence of arsenic in the body. He [1] asserted that this element is a normal and consistent constituent of the thyroid, mammary glands, brain, thymus, hair, skin, milk and bones of man and various animals. The quantities involved were very small, being at most less than 0.75 mg. for each hundred grams of tissue. The content in the blood was almost infinitesimally small, not exceeding one part in fifty millions. Gautier's statements were confirmed in a general way by a number of French chemists, but the quantities recorded by them were decidedly smaller.

Previous to this time the chief interest in the possible presence of arsenic in human tissues lay in its medicolegal bearings. This substance was at one time an exceedingly "popular" poison, so that it figured prominently in many trials for murder. The fatal dose is comparatively small; but since the methods of detection are very delicate, it has usually not been difficult to establish the presence of even minute amounts of arsenic postmortem in the organs when the use of the substance has resulted in death. The finding of quantities approximating a lethal dose was the most important evidence that a prosecutor was wont to gather. Great stress was therefore laid on the use of arsenic-free materials for embalming; and the chemist needed to be doubly cautious with respect to the purity of all chemicals used in his toxicologic analyses.

It is easy to appreciate, therefore, how disconcerting was the report, by a scientist of international repute, regarding the existence of "normal arsenic" in the body, even though the quantity was small at best. There was, however, another aspect of possibly large significance attached to Gautier's comments. In 1895, only a short time before the French communications were made, Baumann announced the discovery of small quantities of iodin as a normal constituent of the body, localized in the thyroid gland. With the rapid demonstration of the great physiologic significance of a few milligrams of a formerly unsuspected tissue component, it was a natural consequence that attention should be directed to the possible biologic importance of traces of other elements. Copper and manganese were early taken into consideration, because of their widespread distribution in nature; and at this juncture came the announcement about arsenic.

The assumption that arsenic plays a part, as does iodin, in the functioning of certain tissues will be clearly negatived if it can be demonstrated that the former element is not a constant constituent of these tissues. This is the outstanding problem of the physiologist. It does not concern the toxicologic expert, to whom it is immaterial whether minute quantities of arsenic in the body are normal or of fortuitous origin, so long as they are of a magnitude too small to have medicolegal significance. Of late, a new interest has been developed by the growing use of arsenicals in human therapy. The problem of their action and distribution will be greatly confused if the drug administered is superimposed on quantities of arsenic, however small, which have an extraneous origin or a "normal" function. This has been clearly recognized by Fordyce [2] and his co-worker at Columbia University College of Physicians and Surgeons, as well as others, in their studies of arsenic as a remedial agent. An examination of the blood, urine, hair and milk from about 200 persons has led to the conservatively made statement that arsenic is found "normally" in a large number of persons, depending on the character of their food, drink, medication and environment. Under conditions of restricted diet, it may be entirely absent. Some persons do not give a positive test at all times. Recent chemical investigations show to some extent that all sorts of drugs and foods may be contributing factors in the detection of arsenic in human beings, the outcome depending on the methods of manufacture and the preparation of the foods. Arsenic is almost invariably present, in varying amounts, in persons applying remedies containing ingredients contaminated with it to inflamed or ulcerating skin surfaces, and to a greater extent in persons receiving the element either by mouth or intravenously, or connected with arsenicals in a preparative way. At any rate, the latest analytic data, including such simple, every-day items as rhubarb and soda, sulphur ointment and sulpho-ichthyolate preparations as well as foods, in the list of "carriers" of arsenic, show that a careful history of the patient is requisite before arriving at a final decision regarding the meaning of the arsenic content of the blood, urine or even the organs.

1. Gautier, Armand: Sur l'existence normale de l'arsenic chez les animaux et la localisation dans certains organes, Compt. rend. Acad. d. Sc. **129**: 929, 1899.

2. Fordyce, J. A.; Rosen, Isadore, and Myers, C. N.: Quantitative Studies in Syphilis from a Clinical and Biologic Point of View, II, Normal Arsenic, Arch. Int. Med. **31**: 739 (May) 1923.

THE FACTS ABOUT REJUVENATION

A year ago, THE JOURNAL reviewed editorially[1] the facts and fancies underlying the two methods of so-called rejuvenation, which had been exploited in the lay press here and abroad. Since then the transplantation of gonads seems to have languished as a newspaper thriller, while the so-called Steinach method of rejuvenation is exploited again in certain papers. Here are specimen miracles: A grandfather, aged 64, was so senile that he could scarcely stand; after submitting to this life-giving operation he not only walked briskly, but carried with ease a weight of 100 pounds. Another, aged 54, was "as weak as a fly"; after the operation he became as strong as an ox, and felt as young as a boy. A third grandfather, bald as an egg for many years, grew football hair after the operation.

The far-reaching possibilities of this biologic revolution now thrust on us bewilder the imagination; but the newspaper writer, whose imagination is brisk, enumerates a few. Obviously there need be no more senility, no more death from old age. All middle-aged and elderly men are to be restored to their youthful vigor, peaceably if they will, forcibly, by law, if they must. The depleted man power of Europe will be rapidly recruited, not only through the zealous activities of young men, but also through the equally potent efforts of their rejuvenated grandfathers. A certain elderly pugilist will spend no more money on nuxated iron, but will be rejuvenated before his next combat with a youthful champion, who it is said, relies on the nux for his vigor. In short, everybody will be happy except young men; they will be handicapped in the struggle for this world's goods, because they will have no more physical, and less mental equipment than their rejuvenated fathers and grandfathers. And, horrible thought, the old men might be mean enough, through repeated rejuvenations, to maintain this lead indefinitely.

This revolutionary discovery and the rejuvenating operation based on it emanate from the Vienna professor Steinach. The discovery is based on the speculation, never verified, advanced by Ancel and Bouin nearly twenty years ago, that a man's virility is due solely to the secretion of certain cells in the testis. These interstitial cells, long known as Leydig's cells, have been rechristened by Steinach the "puberty gland." It is difficult to reconcile the theory that maleness emanates solely from Leydig's cells, with such facts as these: A bearded man was found, postmortem, to possess ovaries, fallopian tubes and a uterus, but no testes. A young woman, feminine in body and mind, was found to possess not ovaries, but testes containing abundant Leydig's cells. A man was found, postmortem, never to have possessed either testes or ovaries.

To the seeker after truth, such observations—and they are well known—suggest that Leydig's cells are not the only factor responsible for virility. Yet Steinach asks us to believe that these cells are the sole source of masculinity and of youth; that a man becomes senile merely because the activity of these cells subsides; that when, as and if they are stimulated, the man regains his youth. To complete the picture, he has announced a means for speeding up these all powerful interstitial cells—an operation which is essentially vasectomy. Stripped of all by-products, the Steinach announcement is simply this: Vasectomy restores youthful vigor.

It so happened that, during the closing years of the nineteenth century, vasectomy was performed on elderly men the world over as a means of mitigating the ills consequent on senile hypertrophy of the prostate. Hundreds of cases were reported in the medical journals of those years by noted surgeons in Europe and in America; in no instance was a restoration of youthful vigor mentioned. Recently Haber and others have practiced vasectomy extensively for the same purpose, stating expressly in reporting their cases that no rejuvenation has been detected. Yet in none of Steinach's many publications is there a reference to these vasectomies, old or new. Fortunately, there are already available records of failure which permit due warning against enthusiastic acceptance of the Steinach procedure. Professor Zeissl,[2] for example, aged 69, has published his personal experience in rejuvenation by the Steinach method. The sole change noted was that erections were less frequent after than before the operation.

There is, then, in support of this so-called rejuvenation method, only a mass of poorly supported, uncontrolled clinical evidence and some laboratory evidence not bearing directly on the point concerned. Certainly there is not as yet any actual proof that rejuvenation has been accomplished in a single individual, or any basis for the belief that it ever will be accomplished.

LEUKOCYTOSIS FOLLOWING INTERNAL HEMORRHAGE

The fact that sepsis is characteristically accompanied by a leukocytosis has become so familiar to physicians of the present day that much stress is placed—and very properly so—on estimations of the number of colorless corpuscles in the blood in cases in which bacterial invasion of the sort indicated is suspected. Pronounced leukocytosis is regarded as a most helpful diagnostic sign when, for example, doubt exists regarding the existence of septic conditions, such as peritonitis. These are so common in medical practice, and the record of leukocytosis is so frequently checked against them, that the occasional failures to find a concurrence

1. Rejuvenation by Testicular Transplantation and Occlusion of the Seminal Ducts, editorial, J. A. M. A. **79**: 137 (July 8) 1922.

2. Zeissl, M.: Warum und wie ich ohne Erfolg gesteinacht wurde, Wien. klin. Wchnschr. **35**: 764 (Sept. 28) 1922.

of sepsis with the characteristic blood findings have received little, if any, attention. Therefore, few reports are available like that published a few years ago by Levinson,[1] in which preoperative diagnosis of acute appendicitis, made largely on the basis of a high leukocyte count, was shown to have been erroneous, the operation revealing a ruptured tubal pregnancy.

It is a fortunate circumstance that the dangers of mistaken diagnosis of sepsis on the basis of an observed leukocytosis have at length been clearly pointed out by Wright and Livingston[2] at Bellevue Hospital, New York. They have demonstrated by experiment on animals that intraperitoneal injections of whole blood in varying amounts always cause an increase in leukocytes in the circulating blood, amounting to as high even as 320 per cent.; whereas similar injections which do not reach the peritoneal cavity fail to be attended with a comparable increment. Marked leukocytosis can also be brought about by any form of cranial trauma that results in subdural bleeding. The mere injection of blood through a needle prick in the dura suffices. When the serous coat of the dura is not involved, no leukocytosis follows the trauma. The "leukocytic curve" reaches a maximum between the sixth and tenth hours, and slowly subsides, whether following intradural or intraperitoneal clots.

These observations, which won for the authors the Merritt H. Cash prize of the Medical Society of the State of New York, are supported by what appears to happen after internal hemorrhage in man through conditions that simulate the intraserous injections of blood in experimental animals. For example, fractures of the base of the skull commonly show subdural blood at necropsy and give a clinical record of high leukocytosis. The latter is also found in many instances of pachymeningitis interna hemorrhagica with recent intradural blood clots. Cases of ruptured ectopic gestation with blood counts taken within twenty-four hours of a typical abdominal attack are said by Wright and Livingston to show a high leukocyte count. Many clinicians will be prompt to recognize the possibilities thus presented of mistaken diagnoses of meningitis, brain abscess, malignant endocarditis, and septic peritonitis on the basis of the blood picture due to nonseptic leukocytoses.

To realize clearly that a hemorrhage within a serous cavity results in a high leukocyte count represents a step in the direction of progress. The New York surgeons point out that in the interpretation of this sign the leukocytic "curve" must be kept in mind; that is, the characteristic maximum being reached in the first ten hours, with a return to normal by the fourth day after the internal hemorrhage. It is helpful to know that after a cranial injury an immediate high leukocytosis—an increase of from 150 to 300 per cent.—constitutes presumptive evidence of intradural bleeding, and that the absence of such an immediate reaction excludes fracture of the base of the skull. Wright and Livingston believe that the factor responsible for the leukocytic reaction is intimately associated with the initial process of clotting. At any rate, the presence or absence of the blood after the first few moments following its liberation into a cavity does not seem to alter the response. The study is one that illustrates clearly how fruitfully animal experimentation and clinical observation may supplement each other. Once again, as so often before, the preliminary tests on the living animal have taught us how to avoid dangerous mistakes in human practice. Truly, such beneficent results ought no longer to require justification for the methods by which they were achieved. In this instance the physician, the surgeon, the neurologist and the gynecologist are the primary beneficiaries; but the entire world reaps the indirect advantages.

1. Levinson, L. A.: Leukocytosis a Deceptive Sign in Abdominal Hemorrhages, J. A. M. A. **64**: 1294 (April 17) 1915.
2. Wright, A. M., and Livingston, E. L.: The Leukocytosis of Internal Hemorrhage, New York State M. J. **23**: 286 (July) 1923.

Current Comment

DEATH OF THE PRESIDENT

The sudden death of President Harding, after a brief illness, when he seemed to be well on the road to recovery, came as a great shock to the American nation. A genial man of the highest ideals and with the simplicity of a great citizen, he had endeared himself to the people whose government he administered. Throughout the period in which he was permitted to guide the affairs of the United States, he had shown sympathy with the aims of modern medicine and taken a personal interest in the welfare of our medical institutions. His death from one of those cardiovascular accidents which often strike fatally, without possible prevention or warning, after certain illnesses, emphasizes again the lesson that the healing art of the physician can be effective only up to the limits of stress of the human machine to which they are applied.

URICACIDEMIA

Uric acid has the conspicuous property of crystallizing readily out of solutions that contain it, when certain conditions are established. Thus, uric acid, as such, or its salts, may separate from the urine to the extent of forming large concretions, or they may deposit in the form of tophi in the tissues. Such behavior is likely to attract attention more easily than does some more abundant but less obtruding component of the body. Accordingly, the expression uric acid has long since acquired the implication of harmfulness in connection with things physiologic. The quack and the proprietary medicine promoter have been quick to appreciate the psychologic possibilities associated with the words and to play them for their advantage. A few years ago a diagnosis of "too much uric acid" was all too often a comforting way of cloaking ignorance, and a profitable way of promoting the sale of nostrums. A scientific turn was derived from Garrod's demon-

stration, by the thread test, that a comparative excess of uric acid salts may circulate in the blood of the gouty. What intermediate degrees of uricacidemia might there be before this extreme manifestation was reached? This was a question of pressing importance at the time when the modern microchemical blood analysis was being evolved. One outcome was that there is by no means always a parallelism between the degree of uric acid retention and the severity of the symptoms in the gouty. Presently, attention was directed to the increased content of uric acid in the blood as a diagnostic sign of nephritis. Myers and his colleagues at the New York Post-Graduate Hospital, in particular, have looked on such an increase, even when it occurs without concurrent retention of urea and other types of nonprotein nitrogenous compounds, as significant of impending kidney impairment. The most recent records, however, secured by Feinblatt [1] of the Long Island College Hospital, indicate that uricacidemia may occur in a large number of unrelated conditions. The great majority of patients with high blood concentration of uric acid, but not of urea nitrogen or creatinin, exhibited no evidence of early chronic interstitial nephritis. In uremia, he adds, there is a lack of parallelism between the figures for uric acid, on the one hand, and those for urea nitrogen and creatinin, on the other. Feinblatt therefore argues against assigning a uniform interpretation to uricacidemia; and he regards the data for the latter of little value unless they are correlated with the content of urea nitrogen or the total nonprotein nitrogen of the blood. Even if it shall be concluded that uricacidemia is not specifically diagnostic of renal insufficiency, as many today prefer to regard it, the symptom remains to afford a further subject for earnest thought to the new generation of clinicians. Uric acid continues to represent an obscure "trouble maker."

1. Feinblatt, H. M.: Uricacidemia; Based on a Study of One Thousand Five Hundred Blood Chemical Analyses, Arch. Int. Med. **31**: 758 (May) 1923.

LIGHT THERAPY IN BONE TUBERCULOSIS

Until recently, the healing influence of sunshine, though seemingly indisputable, belonged among the apparently inexplicable potencies of "nature," for there were no indications that it could be directly implicated in any functional changes in the body. To remark, as has often been done in the past, that fresh air or sunshine or some other environmental condition "stimulates metabolism" or "promotes physiologic reactions" falls short of either explanation or adequate description of the phenomena observed. It has been a real step in advance, therefore, to discover that the modern light therapy can often be correlated with certain definite biochemical changes in the organism. Thus, it is known that exposure of rachitic infants to ultraviolet rays from a mercury vapor quartz lamp, or even to direct sunshine, tends to bring about marked increase in both the calcium and the inorganic phosphate content of the blood serum—factors on which healing is dependent. Good results have been attained in a similar way in the treatment of active infantile tetany during the last three years. In this disease, in which the calcium content of the blood serum also is low, suitable heliotherapy likewise brings about an increase in this element approximately to normal, as was mentioned in a recent issue of THE JOURNAL.[1] Heliotherapy is today recognized as of demonstrable value in the treatment of tuberculosis affecting the bones; hence it was anticipated, in view of experience with rickets and tetany, that the superior efficiency of sunshine in the tuberculous malady might be due to an action on the phosphate metabolism similar to that occurring in rickets, which favored the deposition of new bone in the focus of disease, and thus produced a cure. Blood analyses made for a considerable number of patients who actually showed great improvement through exposure have given negative results to Tisdall and Harris [2] of Toronto. In many cases the concentration of phosphorus was found to be actually below that present in normal serum. Evidently the modus operandi of sunlight in osteogenesis, or at any rate in certain phases of healing processes seen in bone tuberculosis, is not yet apparent despite the hopes of impending explanation voiced in these columns.

1. Light Therapy in Tetany, Current Comment, J. A. M. A. **81**: 217 (July 21) 1923.
2. Tisdall, F. F., and Harris, R. I.: A Note on the Phosphate Content of Cases of Bone Tuberculosis Treated by Heliotherapy, Canadian M. A. J. **13**: 177 (March) 1923.

CURING PRINCE DON JAIME'S DEAFNESS AGAIN

Prince Don Jaime, second son of the king of Spain, has been deaf since his birth. More than three years ago the "International Feature Service," which furnishes lurid and sensational "features" for the string of Sunday newspapers that it serves, carried a full page article detailing in typical Sunday newspaper style the alleged cure of the young prince by a London "bone-setter." According to the article, the bone-setter explained that the young prince's affliction was "caused by displacements of the atlas and axis bones of the neck" which, he went on to state, "produced a pressure on the great auditory nerve to the ear and caused deafness." The bone-setter, the story ran, "corrected this displacement" and "the boy immediately began to hear." At the time, THE JOURNAL investigated the matter and found that the claims were sheer buncombe. Soon after this article appeared, osteopathic colleges and individual osteopaths reproduced it in full and claimed that the wonder-working Londoner was a member of their cult. Chiropractors did the same thing. This was in 1920. Now, in August, 1923, the papers of the country are carrying news items to the effect that one "Dr." Curtis H. Muncie, a Brooklyn osteopath, has just returned from Europe where, according to earlier newspaper reports, he had been called to treat Prince Don Jaime. According to the report in the New York *Times*, Muncie, after a manipulation, cured the prince of his ailment. From the same source we learn that Muncie declared that the lad's deafness was due to "a state of complete deformity" of the eustachian tubes, and Muncie's treatment was simply that of "reconstructing the eustachian tubes"—a mere bagatelle for

an osteopath. Presumably, we may look for another advertising campaign on the part of osteopaths and chiropractors detailing the marvelous results that these gentry are able to obtain. Meanwhile Prince Don Jaime is still deaf!

Medical News

(PHYSICIANS WILL CONFER A FAVOR BY SENDING FOR THIS DEPARTMENT ITEMS OF NEWS OF MORE OR LESS GENERAL INTEREST: SUCH AS RELATE TO SOCIETY ACTIVITIES, NEW HOSPITALS, EDUCATION, PUBLIC HEALTH, ETC.)

ALABAMA

Appropriation for Health Work Withdrawn.—Dr. Samuel W. Welch, Montgomery, state health officer, has been notified by Dr. John A. Ferrell of the International Health Board to the effect that the board's appropriation for pursuing health work in Alabama has been withdrawn. A bill will be presented to the legislature asking for an annual appropriation to take care of the deficiency.

Hospital News.—Dr. William R. Snow, Manchester, is erecting a private hospital in Winston County which will cost about $20,000 and contain twenty rooms.——Bald Ridge, near Rosedale, Birmingham, embracing 110 acres, has been purchased as a site for the Jefferson Tuberculosis Sanitarium. A campaign to raise $200,000 for the project was recently successfully concluded.——The Russell Hospital, Alexander City, erected at a cost of $100,000 and providing sixty-five beds for patients, was formally opened, July 17.

ARIZONA

Tucson Physicians Indorse Baby Health Center.—The Pima County Medical Society, at a meeting held July 20, approved plans presented by Miss Cathryn Kessler, government nurse, for a center for feeding and caring for babies of the city and county. It was proposed that a physician supervise the center, and that a trained nurse be in charge. Milk would be prepared and sold at cost; advice given mothers who need it, and babies would be registered and weighed. The center would be supported by charity or special funds.

ARKANSAS

Hygienic Laboratory Established.—Under authority of an act of the 1923 legislature, the state hygienic laboratory will be established in the capitol building, Little Rock. Dr. Charles W. Garrison, state health officer, will be in charge.

CALIFORNIA

Physician Contests Revocation.—Dr. Frederick H. Hadley, San Francisco, whose license was revoked, May 29, after a hearing before the state board, has petitioned for a writ of review and appeal, it is reported. Dr. Hadley was charged with assisting a chiropractor in the treatment of a patient.

Physicians Acquitted.—After the jury had been out fifteen minutes in the trial of Drs. John R. Morris and James G. Anderson, both of Petaluma, they brought in a verdict of not guilty. The physicians were charged with causing the death of Mrs. Louise Prestwood, Nov. 11, 1922, following an operation.

CONNECTICUT

Personal.—Dr. Raymond D. Fear, Bridgeport, of the state health department, has been appointed director of the bureau of epidemiology of the state department of health of Alabama, with headquarters at Montgomery.

FLORIDA

University News.—The new school of pharmacy, for which money was pledged by the state pharmaceutical association, will be opened at the University of Florida, September 10, by the state board of control. Towner R. Leigh has been appointed director of the school.

Medical Journal in New Form.—With the first number of Volume 10, the *Journal of the Florida Medical Association* appears in a larger size and with more than twice the usual amount of material. The editorial staff has been reorganized. Dr. Graham E. Hensen, St. Augustine, is editor; Drs. Shaler A. Richardson and Robert B. McIver, Jacksonville, are associates.

Pioneers in Lye Legislation.—The Florida Medical Association passed a resolution at its annual meeting in May requesting the legislature to make it compulsory for all manufactures to label conspicuously caustic alkalis to show their poisonous nature and to name antidotes. The legislature promptly passed a bill modeled, it is said, after the Pennsylvania Lye Bill, which was passed in April. Thus Florida and Pennsylvania have been pioneers in a movement that should embrace the country.

State Board Plans Scholarship.—The State Board of Medical Examiners has in mind the creation of a scholarship for premedical education each year for a worthy young Floridian at the State University at Gainesville. The small sum left by the old board has been held intact, it is reported, and some funds added. The members of the board are paid only during the period of the examinations, and the balance has been largely used in revocation proceedings. Fifty-eight applicants applied for examination at the last regular meeting of the board in June.

GEORGIA

Personal.—Dr. Donald T. Rankin, psychiatrist, Georgia State Sanitarium, has resigned to accept a position at the State Hospital for the Insane, Allentown, Pa.——Dr. John P. Kennedy has been reelected city health officer of Atlanta.

ILLINOIS

Personal.—Dr. Pierre A. Steele has been appointed medical director of the Macon County Tuberculosis Sanatorium, Decatur.——Dr. Henrietta A. Calhoun, Rockford, has been appointed lecturer in bacteriology and histology at Rockford College, and director of the laboratory at the Rockford Hospital.——Dr. Frank L. Alloway has resigned as chief of the eye, ear, nose and throat service at the U. S. Public Health Service Hospital No. 76, Maywood.

Chicago

Poland Decorates Three Chicago Physicians.—Drs. Frank Lenart, Alexander Pietrzykowski and Stanislaus F. Wietrzynski, Chicago, have been awarded the cross for bravery by the minister of military affairs of Poland, for service in the Polish army in France and Poland. The presentation was made by the consul-general of Poland on Decoration Day.

Chiropractors Arrested.—According to reports, H. J. Norman, a chiropractor of Chicago, was arrested, July 21, for having failed to appear in court as ordered, and for jumping his bond when charged with obtaining $100 on false pretenses.——Mrs. Marie Tuna and Louise Volasak were arrested, July 17, on order of A. M. Shelton, director of the state department of education and registration, for practicing medicine without a license.

INDIANA

State Board of Health News.—Dr. Hugh A. Cowing, Muncie, has been elected president of the state board of health to succeed Dr. John Hewitt, Terre Haute. Dr. Adah McMahan, Lafayette, was elected vice president.

Diphtheria Stops Business.—Thirty-four cases of diphtheria were reported present in Hamlet, July 27, when it was said business activities were suspended on account of the epidemic. Hamlet was a village of 480 people in 1920.

County Fair Food Handlers.—It has been announced that persons at the Hancock County Fair who sell or handle food for sale must have a health certificate. A member of the state board of health will be present at all sessions to see that this requirement is enforced. The state law further requires that containers for making acid drinks be of glass or pottery, and that sanitary cups be used in dispensing them.

A Central Health Committee.—The secretary of the state board of health called a conference which met at Indianapolis, July 20, to promote greater interest in health issues. A central committee which will act temporarily as an executive committee was appointed comprising: Dr. William F. King, secretary of the state board of health, chairman; Dr. Frank C. Hamilton, president of the Indiana Dental Association; Dr. Frank W. Foxworthy, representing the Indiana Medical Association; M. A. Auerbach, representing the Indiana Tuberculosis Association; Adolph Fritz, the Indiana

Federation of Labor; Mrs. Ella B. Kehrer, the Indiana Federation of Women's Clubs; Mrs. Richard Lieber, the state Parent-Teacher Federation; Benjamin J. Burries, superintendent of public instruction, and Miss Annabel Peterson, the Indianapolis chapter of the Red Cross. The National Council's plan for physical examinations was considered, and arrangements made for meetings to be held in various parts of the state to stimulate greater interest in health matters.

IOWA

University News.—Twenty-two physicians have enrolled in the State University of Iowa Medical College for the course in the use of insulin, which was made possible by the Rockefeller gift for that purpose. Classes for training will be limited to three physicians and the work will be completed by September 24.

Red Cross Service Abandoned.—The Linn County chapter of the American Red Cross will discontinue the county nursing service which it has maintained for the last four years, it was announced at chapter headquarters, July 26, to take effect, September 1. A lack of money to carry on the service is given as the reason.

Personal.—Dr. Charles S. Grant, Iowa City, was reelected president of the state board of health at the annual meeting, Des Moines, July 17.——Dr. D. J. McCarthy, Davenport, received the Order of the Eagle and a gold medal from Serbia in appreciation of his services in Roumania and Serbia with the refugees.——Dr. John W. Shuman, Sioux City, professor of internal medicine at the American University at Beirut, Syria, has resigned and will return to the United States.

KENTUCKY

Trachoma Field Clinics.—Under the direction of Dr. Charles B. Kobert, director of the trachoma bureau of the state board of health, a field clinic, left Louisville, July 12, to tour south central Kentucky treating victims of trachoma. Clinics will be held in Butler, Ohio, Edmonson and Grayson counties, the party returning to Louisville late this fall. This is the third year that Dr. Kobert has taken "the mule-drawn wagon" for the purpose of conducting trachoma clinics.

MARYLAND

Report on First Preschool Clinic.—Undernourishment, enlarged tonsils, adenoids and defective teeth were revealed by the first preschool clinic held at Tilghman's Island by the state child hygiene bureau, recently. Dr. J. H. Mason, Jr., director of the bureau, plans to extend the preschool clinic work to other counties. The island has an all-white population of 1,200, and no poverty. About eighty children were examined at the clinic. Nutritional classes will be established in the schools; efforts will be made to arrange with the Emergency Hospital, Easton, for removal of tonsils and adenoids, with consent of the parents, and a dentist will be attached to the clinic.

State Law on Food Handlers Vague.—Dr. J. H. Shrader, Baltimore, chief of the Bureau of Chemistry and Food, has withdrawn the department inspectors who were checking up the cleanliness of restaurants, boarding houses and soda fountains, it is reported. The state law merely provides that utensils must be either "washed or sterilized," and prosecutions except for the most flagrant violations of cleanliness will not stand in the courts. The health department is awaiting an opinion from the attorney-general on the application of the state law. A new food ordinance for the city of Baltimore is being drafted which will remedy conditions, providing the existing law is found powerless to do so.

Hospital News.—The Union Memorial Hospital will be moved to the new building at Calvert and Thirty-Third streets, September 3; the hospital will be open for the reception of patients, September 15. Only cases which can be disposed of in a week or ten days will be received at the old hospital after the second week in August. The new building will accommodate 176 patients. No equipment will be transferred, as the new building will be completely equipped.——Approval of the location of the Baltimore Eye, Ear, Nose and Throat Hospital, without a free dispensary, at the southwest corner of Eutaw Place and Lanvale Street, has been given by the Zoning Board of Appeals, following a public hearing. Opposition to the location has been intense. The hospital will continue to maintain a number of free beds. ——The immediate purchase of five tracts of land adjacent to the Municipal Hospital at Montebello has been recommended by Dr. C. Hampson Jones, health commissioner of Baltimore. The land is needed for a $5,000,000 hospital group, in accordance with plans made at the time the infectious disease units now under construction were laid out. The plans call for a tuberculosis hospital, a maternity hospital, a hospital for children, a hospital for the treatment of social diseases and a general hospital, in addition to the hospital for infectious diseases. The city health department does not intend to interfere with the general hospital at Bay View.

MASSACHUSETTS

University News.—The Hancock Life Insurance Company, Boston, has given $20,000 to the Harvard Cancer Commission, of which sum a fourth is to purchase diagnostic apparatus; the remainder is for the permanent fund. The insurance company previously gave $30,000 toward the building of the Huntington Hospital, which is devoted to cancer cases.

MICHIGAN

Bequest for Medical Research.—Under the will of Mrs. Ellen M. Chipman, a bequest of $5,000 was left to Dr. Don M. Campbell, Detroit, for the study and treatment of eye, ear, nose and throat diseases.

Personal.—Dr. Mabel E. Elliott, Benton Harbor, has resigned as field director in Greece of the American Women's Hospitals, it is reported.——Dr. John Vanderlaan, Muskegon, a member of the board of education for thirty years, was recently elected president of that board for the eleventh time.

Proposal to Close Unfit Dwellings.—Dr. William DeKleine, city health officer of Saginaw, proposes to close up certain dwelling houses which are considered unfit for human habitation. Quarantining houses for a lack of sanitation is a temporary proceeding which does not bring results in such cases. The procedure, according to Dr. DeKleine, is to notify the owner of the property in question formally that the dwelling is not fit for human beings. If after a reasonable time, he fails to comply with the notice, circuit court proceedings follow. The judge issues an order closing the house to all tenants, in cases decided favorably.

MINNESOTA

Freshman Class All State Residents.—The 100 students who will be admitted to the freshman class of the University of Minnesota School of Medicine have been selected. It happens that all of them are residents of the state. There were about 200 applicants. It is reported that students whose applications were not accepted may be sure that one of four causes was operative, according to Dr. Chauncey J. V. Pettibone, Ph.D., faculty adviser for freshman students: nonresidence in Minnesota, insufficient preparation or lack of studies invariably required for admission, an average lower than "C" in premedical studies, or the arrival of records too late to permit consideration.

MISSISSIPPI

Personal.—Dr. James W. Cox, Caledonia, has been appointed by the governor as health officer of Lowndes County.

NEW JERSEY

Additional Physician on Governor's Advisory Board.—Dr. Arthur W. Belting, Trenton, has been appointed by the governor a member of the new medical advisory board (THE JOURNAL, July 21, p. 221).

Illegal Practitioners Arrested.—According to reports, Charles Baudendistel, West New York, N. J., a licensed osteopath, was arrested on a charge of practicing medicine without a license. He pleaded guilty and was fined $200, July 5.

NEW MEXICO

Personal.—Dr. Oscar C. West, Albuquerque, has resigned as city and county health officer, to accept a position in Central America.

NEW YORK

Free Insulin Clinic.—A free insulin clinic was opened, August 1, at the Beth Moses Hospital, Brooklyn, in charge of Drs. Leon Loewe, Morris M. Banowitch and Benjamin Davidson.

New Tuberculosis Sanitarium.—The Suffolk County Tuberculosis Sanitarium is about completed and will be opened

for the reception of patients in September. The supervisors of Suffolk County have voted $6,000 to furnish and equip the building.

New York City

Triplets Twice in One Hundred Years.—Triplets were born at the New York Nursery and Child's Hospital, July 25. The institution had operated ninety-nine years before such an event occurred. The first triplets born in the institution arrived last February.

Jewish Charities Opens New Clinic.—In connection with the work of the Jewish Hospital, Brooklyn, the Brooklyn Federation of Jewish Charities has opened a babies' feeding clinic, in which 1,200 babies are registered. This clinic, which accepts only children under the age of 3 years, has been so well attended that a clinic for children over 3 years old has been opened. Drs. Sampson J. Wilson and William K. Jacobs are in charge.

Child Health Home Celebrates Semicentennial.—The fiftieth anniversary of the founding of the first fresh air home in America by the Children's Aid Society was celebrated, July 23, at the Children's Health Home, at the foot of Eighteenth Avenue, Bath Beach. William Church Osborn, president of the society, and other officers delivered addresses. In its first summer, 1873, the home gave outings to 1,260 children, while last summer more than 35,000 children were benefited in the eight homes established by the society.

City Clinic at Seaside.—A clinic to be known as the Seaside Clinic at Coney Island was formally opened, August 1, by Health Commissioner Monaghan to care for emergency cases, such as heat prostrations, bathers suffering from submersion and victims of accidents. Serious cases will be removed to the Coney Island Hospital. The clinic, which is under the jurisdiction of the health department, will be open daily. This is the first of its kind, it is said, and if successful other clinics will be opened.

Pushcart Beverages Under Fire.—The commissioner of health issued an order, July 10, for an active campaign against the sale of beverages in unclean drinking glasses. Numerous wagons and carts with inadequate facilities for cleansing glasses sell beverages and candy on the streets in the summer months. Regulations of the board of health require that paper cups or other single service container must be used. The sale of candy except when properly wrapped or otherwise protected from flies and dust is covered by existing regulations, the enforcement of which is also a feature of the commissioner's recent order.

Personal.—Dr. Erving G. Holley resigned as assistant physician to the Brooklyn State Hospital, a position he has held since 1911.——Dr. Charles Wadsworth Johnson, Mount Vernon, has been appointed honorary deputy fire commissioner by the commissioner of public safety.——Dr. John B. Walker and Dr. James Ewing have received the honorary degree of Doctor of Science from Amherst College.——Yale University has conferred the degree of Doctor of Science on Dr. Jacques Loeb of the Rockefeller Institute.——George A. Soper, Ph.D., has been made managing director of the American Society for the Control of Cancer.——Dr. William Darrach, dean of the medical faculty, will represent Columbia University at the meeting commemorating the centenary of Joseph Leidy, at the Academy of Natural Sciences, Philadelphia, December 6.

NORTH CAROLINA

Personal.—Dr. George Collins, Charlotte, assistant county health officer, has resigned to accept a position with the state board of health.——Dr. Eugene B. Glenn, Asheville, has been appointed a member of the newly created board of health of that city.——Dr. James B. Wright, Black Mountain, has been appointed health officer of that city by the board of aldermen.

County to Enforce Vaccination.—The Buncombe County health board adopted regulations, July 17, which require that all children in the public schools of the county who have not been successfully vaccinated against smallpox since 1920, must be vaccinated before Jan. 1, 1924. Asheville, the county seat, has had this regulation for several years, but the county heretofore has not. There are, it is said, about 10,000 pupils in the rural schools, and about one half that number have been vaccinated.

OHIO

Hospital News.—The Cleveland Clinic Hospital has let the contract for a $500,000 building to be erected at Ninetieth Street, near Euclid Avenue.——A three-story addition to the Lake County Hospital, Painsville, will soon be built at a cost of $200,000.

Twenty-Two Chiropractors Jailed.—Twenty-two chiropractors of Toledo, found guilty of illegally advertising and practicing medicine without a license, were committed to jail, July 24, to serve approximately a year each, after refusing to pay fines of $200 each, it is reported.

Hospital Appropriation Reverts to General Fund.—The $200,000 appropriated by the eighty-fourth general assembly to purchase a site for a new institution for the feebleminded lapsed and reverted to the general revenue fund of the state, June 30, according to the *Ohio State Medical Journal*. The state welfare director recognized the need of a new institution, but declared it the "height of folly" to buy land at a high price now and allow it to be idle two years because of lack of funds to erect the buildings.

Supreme Court Upholds State Board.—In an action initiated in the common pleas court of Hamilton County by George D. Meeker and others who sought to enjoin the state medical board from enforcing the law, which action finally reached the supreme court, a decision written by Judge Wanamaker and concurred in by the other six members of the court settled the following points: 1. The state administrative code is not unconstitutional so far as the powers and duties of the state medical board are concerned. 2. An individual who has not exhausted all his rights under the appeal provided by law from the action of the state medical board cannot invoke the aid of a court of equity. 3. Applicants must stand on individual rights and cannot join to institute a class suit to hold a law invalid. 4. Actions against public officials must be instituted in the courts located within the county where the principal offices are maintained.

OKLAHOMA

State Medical Examining Board.—Governor Walton has announced the following four-year appointments to the state board of medical examiners: president, Dr. Charles D. F. O'Hern, Tulsa; vice president, Dr. Okey N. Windle, Sayre; secretary-treasurer, Dr. James M. Byrum, Shawnee, and members, Drs. Lewis E. Emanuel, Chickasha; Daniel W. Miller, Blackwell; G. E. Pyatt, Oklahoma City; Harper Wright, Grandfield; Henry C. Weber, Bartlesville, and W. E. Sanderson, Altus. Miss Susan B. Rogers, Muskogee, was appointed a member of the trained nurses' examining board.

PENNSYLVANIA

Child Welfare Convention.—The state commissioner of welfare called a convention which met at Darlington, July 25, for the purpose of raising the standard of child welfare work in the state. Eighty-five delegates from the leading children's institutions attended. The director of the bureau of children of the state welfare department presided.

Vaccination Law to Be Enforced.—Dr. Charles H. Miner, secretary of the state board of health, has taken measures to assure that no children are admitted to the public schools this fall who are not immunized against smallpox, in accordance with the state law, it was announced, July 24. Medical inspectors appointed for the new term have been advised by Dr. J. Bruce McCreary, director of the bureau of child health, to examine carefully the scars of pupils whose record does not show that the previous vaccination was successful. Official vaccinations will be performed free of charge.

Layman Appointed County Health Officer.—Miss Jennie Simmons, for nearly fifteen years a public health worker in Lycoming County, has been commissioned county health officer. The appointment, it is reported, is a part of the public health nursing division's plan of "doubling up" on health activities made necessary by reduced appropriations. Miss Simmons' appointment, it is said, means the elimination of eight part-time health officers scattered throughout the county, whose duties included the enforcement of quarantine for contagious diseases, the examination of water supplies, and the investigation of public nuisances. A similar problem of retrenchment facing other communities of the state has been met in much the same manner.

Philadelphia

Smallpox.—July 29, a general call for voluntary vaccination was issued in a bulletin by the department of public health. July 18, a young negro woman was reported ill with chickenpox, but the case proved to be smallpox. Another case was discovered in the same house. The woman had recently arrived from the south and members of her family were living in a house on East William Street. When this house was investigated, four persons were found ill with

smallpox. These were men and women employed in industrial establishments and homes throughout the city, thus making indirect contact between these cases and hundreds of families in the city.

Municipal Court Medical Department.—According to a report by Dr. Thomas A. Shallow, medical director of the municipal court, a total of 9,318 persons was received in its medical department. In addition, there were 9,940 physical and 6,113 mental examinations, and a total of 10,417 treatments given. The number of children received in the nursery was 5,533. The medical department comprises the building at Twentieth and Summer Streets, with which is associated the Juvenile House of Detention, the medical division at Twelfth and Wood Streets, used exclusively for women's cases, and the Gynecean Hospital. Hospitals throughout the city have been cooperating with the work of the medical department in providing special care for certain cases. A dental department forms a part of the general medical department, and clinics for children are held every day. During 1922, the cost to the city for caring for dependent children was estimated at more than $600,000.

RHODE ISLAND

Personal.—Dr. Elizabeth M. Gardiner, director of the state child health bureau, has resigned, effective August 31, to accept a position as associate director of the Department of Maternity, Infancy and Child Hygiene, New York.

TENNESSEE

Personal.—Dr. Eugene L. Bishop, Nashville, has been appointed superintendent of the division of rural sanitation of the state board of health.

TEXAS

Dengue Fever Appears Early.—The first cases of dengue fever discovered in Dallas this year were reported, July 5, to the quarantine division of the city health department. Dengue was not reported last year until August, when it appeared in Galveston. It did not become prevalent in Dallas until September.

University News.—Promotions and appointments in the University of Texas Department of Medicine, Galveston, were made by the board of regents, July 10, as follows: Dr. H. O. Knight, formerly associate professor, was promoted to full professor of anatomy; Dr. S. M. Morris, formerly professor of ophthalmology, otology and laryngology, became professor of ophthalmology; Dr. D. P. Wall, professor of otology and laryngology; Dr. E. D. Crutchfield, associate professor of dermatology and syphilology; Dr. W. B. Reading, associate professor of diseases of children; Dr. W. R. Cooke, associate professor in obstetrics and gynecology; Dr. Joseph Kopecky, associate professor of clinical medicine and clinical pathology; Dr. C. T. Stone, associate professor of clinical medicine; Dr. E. L. Rice, adjunct professor of clinical medicine; Dr. Violet H. Keiller, associate professor of surgical pathology; Dr. George E. Bethel, adjunct professor of anatomy; Dr. Meyer Bodansky, adjunct professor of biologic chemistry. Drs. G. W. N. Eggers, C. R. Enloe and E. M. Jordan were appointed instructors in anatomy, and Dr. W. H. Hill was appointed instructor in pathology.

WISCONSIN

The Sixteenth County Health Center.—Waukesha County opened a health center at Waukesha, July 17. This is the sixteenth county to establish a health center which is the maximum number permitted by the available funds. These centers are conducted by the state board of health under the Sheppard-Towner Act plan, it is reported.

Civil Service Ruling Changed.—In a recent advertisement of the Wisconsin Civil Service Commission calling for physicians to enter the service of the state institutions, a condition imposed was that applicants must be residents of Wisconsin. Commenting on this restriction, the *Wisconsin Medical Journal* (May) said, in part:

> This provincial attitude, established two years ago, does no credit to professional service in Wisconsin public institutions. However gratifying such restrictions may be to laborers and tradesmen, they offer an affront to medical men of qualifications and mettle that we should have in our state hospitals and sanatoria.

June 12, the Dane County Medical Society considered this question and appointed a committee to urge a change in the commission's ruling. June 26, the change was announced that hereafter candidates who are legal residents of the United States will be admitted to the examinations.

PHILIPPINE ISLANDS

Protest New Law.—At the Central Luzon Health Officers' Assembly, May 22, resolutions were unanimously adopted against recently enacted legislation which provides that any physician may be appointed by the governor-general, on the recommendation of the secretary of public instruction, to any commissioned rank in the Philippine Health Service without examination.

University of the Philippines.—Changes in the medical faculty of the University of the Philippines College of Medicine and Surgery have recently been announced as follows: Dr. Libozia Gomez, formerly chief of the department of biology, bureau of science, has been appointed professor of pathology, and acting chief of the department, vice Dr. L. W. Smith, resigned; Drs. R. L. Navarro and J. Z. Sta. Cruz, have been appointed instructors in the same department; Drs. Trinidad Banuelos and Fidel Cuajunco have been appointed instructors in anatomy vice Drs. Cesareo Santa Ana, now chairman of the board of examiners for nurses, and C. Camomot, who has accepted a position with the Philippine Health Service.

GENERAL

International Health Education Conference.—This conference was held in San Francisco, as a section of the World Conference on Education, June 28-July 6. The physician, research worker and educator met in the same forum to discuss a broad, sane and practical program for the promotion of the health of school children. Among the speakers were: Dr. Haven Emerson, professor of public health administration, Columbia University; Elmer V. McCollum, Ph.D., Johns Hopkins University; Alonzo E. Taylor, director of Food Research Institute, Stanford University; Bird T. Baldwin, Ph.D., State University of Iowa College of Medicine; Dr. Thomas D. Wood, New York; Dr. Harold K. Faber, professor of pediatrics, Stanford University School of Medicine; Jessie M. Hoover, milk utilization specialist, U. S. Department of Agriculture; Dr. Guy Milberry, dean of the dental department, University of California, and Dr. John M. Dodson, Chicago.

Postponement of International Congress of Ophthalmology.—The Committee of British Ophthalmologists appointed to organize an international congress in 1925 finds with regret, it is said, that it is unable to do so in accordance with conditions under which the British invitation was accepted by the Washington Ophthalmologists Congress in 1922. It was decided at the last congress that the next session should be strictly international and that German should be one of the official languages. The committee has since been informed that the Société française d'ophthalmologie, the Société d'ophthalmologie de Paris, and the Société belge d'ophthalmologie have passed resolutions to the effect that they feel unable to participate in a congress if Germans are invited. The committee believes that to proceed under these circumstances with a congress would tend to perpetuate a schism in the ranks of ophthalmology and to militate permanently against it. The committee has therefore, it is said, reluctantly decided to postpone the congress.

LATIN AMERICA

Public Health Service in Costa Rica.—The new law of Feb. 24, 1923, mentioned in THE JOURNAL, May 19, 1923, which established the bureau of hygiene and public health, provided for a department of ankylostomiasis, this disease being as frequent in Costa Rica as in other countries of similar geographical position. It is officially stated that 60 per cent. of the population of Costa Rica are affected, against 96 per cent. in Ceylon and 30 per cent. in Peru. Since the establishment of the school department, in 1914, with medical inspection of schools, cases of infectious diseases among school children have declined from 4,715 in 1918 to 478 in 1921, and 126 in 1922.

Occupational Therapy for the Insane in Brazil.—The administration of Minas Gerães has constructive plans under way for remodeling the public health service, especially in regard to mental and nervous diseases. At Bello Horizonte, a neuropsychiatric institute has been established, in connection with a hospital accommodating 120 neuropathic patients, for training alienists for government clinics of this type. The central hospital for the violent insane and a colony for those susceptible of readaptation to social life are functioning at Barbacena. At the colony an open door policy is

observed, with manual labor, mostly stock raising, as therapeutic measures. Patients are exchanged between the hospital and the colony, so that when a violent insane patient calms down to a point of harmlessness, he is sent to the colony, and, on the other hand, when an inmate of the colony becomes violent, he is sent to the hospital. This system has worked so well that three other colonies will be established at three other points in the state.

Personal.—Dr. Guillermo Parra, president of the National School of Medicine, Mexico, has resigned.——There have been four deans of the faculty of medicine at Havana in less than six months. Dr. Tamayo resigned in January, Dr. Alacán serving in his place until Dr. Plasencia was elected. He died before assuming office; Dr. E. Martínez was then elected, but has recently resigned, and Eusebio Hernández thus becomes dean.——Dr. Tiburcio Padilla has been appointed *profesor suplente* of semeiology at the Buenos Aires medical faculty. His thesis was on "Functional Exploration of the Vegetative System." A banquet was tendered to celebrate his appointment. The invitation was signed by nearly a hundred leading physicians. He is an editor of the *Semana Médica*, "founded thirty years ago by Tiburcio Padilla (h.)." ——Dr. Luis Cuervo Márquez, Bogota, has been appointed minister plenipotentiary from Colombia to Great Britain. ——The campaign to investigate the epidemic of fever at Bucuramanga, Colombia, has been placed in charge of Dr. F. A. Miller, who has been directing the campaign against hookworm in that country under the auspices of the Rockefeller Foundation.——One of the editors of the *Tribuna Médica* of Santo Domingo, Dr. Fernando A. Defilló, has been appointed director of the National Leper Asylum. ——The *Revista Pasteur*, published by the medical students of Cartagena, Colombia, is to dedicate its next number to Dr. T. A. Tatis, professor of gynecology.——Dr. Mark Boyd and M. Magoon, of the Rockefeller commission, are in Rio de Janeiro to organize the antimalaria campaign.——Drs. E. J. B. Gaillard and P. Fernandes dos Santos, Brazilian navy medical officers, have been appointed in charge, respectively, of the Copacabana Infirmary and the Central Marine Hospital.——Dr. Roberto Cotrim has been appointed in charge of the new public health station to be organized at Rezende.

FOREIGN

Personal.—Dr. Robert H. Todd and Dr. William T. Hayward are the first to receive the gold medal instituted by the British Medical Association in Australia for "distinguished service." The medal will be presented at the congress of the association in Melbourne in November.——Dr. J. J. D. Harris has resigned the directorship of the laboratory of microbiology and pathology of the department of public health of Queensland, Australia.

Cholera and Plague in British India.—The Asiatic part of the British empire leads the world in prevalence of these diseases, according to the *Office International d'Hygiène Publique* for May, 1923, with 873 deaths from cholera from January to April, and 101,208 deaths from plague during the same period. Java, Egypt and Peru follow with, respectively, 1,367, 422 and 116 deaths from the plague during the period from January to May of this year.

Headquarters for Child Welfare Work in Spain.—A recent official decree provides for the foundation of the National Escuela de Puericultura, Madrid. It is designed to train pediatricians and others in the care of infants and young children, and serve as headquarters for all measures for infant welfare work, experimental and clinical, as well as for statistics. The school is in charge of and to be supported by the Consejo Superior de Protección a la Infancia.

Inconsistency of the Laws in Sweden.—The police of Linköping recently arrested a quack for unlawful practice of medicine. On questioning, it was found that he had been a mechanic at some of the factories, but lost his job, so he began his practice of benevolence to ailing humanity without bothering with any preceding study. He could not, however, be condemned on this ground because the law against quackery covers only certain types of diseases, such as tuberculosis, cancer and contagious diseases, and the courts usually hold that, since a quack cannot know with which disease he has to do, he is innocent and goes free. The law provided no penalty for his practicing medicine, but penalized him for selling drugs which can be dispensed lawfully only by a qualified pharmacist.

The Medical Center for Aerial Navigation in France.—The *Presse médicale* gives the details of the ceremonies attending the inauguration of the medical center for examinations and research at the *aero-port* of Bourget. The undersecretary of state for aeronautics presided, and Dr. Garsaux extolled the equipment for research on low atmospheric pressure. There is a chamber, 3 by 5 meters, with electric turbine to induce a vacuum, and electric light signals and telephones to insure safety during the experiments. Tests were made with three pilots to illustrate the workings of the pneumatic chamber, the pressure corresponding to that of an altitude of 3,500 meters (over 11,000 feet), and the temperature 29 below zero C. (20 below zero F.). The Paul Bert pavilion, as the medical center is called, has hospital accommodations, besides the numerous laboratories for physiologic research and examination of candidates. Our exchange adds that the installation surpasses anything of the kind in other countries to date. Bourget is the center of the commercial aeroplane navigation service.

Congress of the Scandinavian Surgical Association.—The fourteenth congress of the Scandinavian Surgical Association was held in Stockholm, June 14-16, with about 200 delegates present. No important new feature developed during the discussions on "Treatment of Fracture of the Neck of the Femur," led by Professors Faltin, Helsingfors, and Lindgren, Upsala. The introductory address to the discussion of the "Position in Obstetrics of Cesarean Section," was given by Brandt, Christiania, and Essen-Möller, Lund. The discussion on "Treatment of Pleural Empyema" was led by Einar Key and P. N. Hansen. Rovsing recommended anew his suction drainage by the retention catheter. The fifteenth congress will be held in Copenhagen under the presidency of Prof. Thorkild Rovsing, with Prof. P. Bull reelected as secretary. The closing address was delivered by N. Aars Nicolaysen, Bergen, which was followed by a discussion that emphasized the importance of examination for urea before prostatectomy, and recommended cystostomy in all cases in which there is nitrogen retention in the blood.

Medical Practice in the Scottish Highlands.—A recent report of the Scottish Board of Health states that medical practice in the highlands and islands is growing increasingly attractive to physicians, and that for positions recently advertised, there have been numerous applicants. It is also stated that in some isolated communities too small to occupy the full time of a practitioner, special financial arrangements have been made. Travel in the islands is always uncertain and frequently hazardous. An account is given in which the weather rendered it impossible for a medical officer in Portree to visit a patient in the island of Soay, to the south of Skye:

> I received a telegram from Elgol, Friday morning, asking me to go to a man (on the island of Soay) who had damaged his eye. I had several patients in at the time who had come from North Ramsay to consult me, and they kept me until about 12 o'clock noon. I then set out for Soay, but had to see an important case in Portree before going. On the road to Glenbrittle, the last 8 miles of which is very rough, I had considerable tire trouble involving a good deal of delay, so that I did not reach Glenbrittle until about 4:30 p. m., when it was beginning to get dark. On finding that the boat from Soay was not at Glenbrittle to meet me, I went to the guide at Glenbrittle and asked him to guide me across the hill—a distance of about three miles—to the place from which one can signal (by lighting a fire) to Soay for a boat. The guide refused to undertake the journey in darkness on account of the dangers. I may say there is no track, and that there are three streams to cross, over which there are no bridges. I waited all night at Glenbrittle. During the night and in the morning heavy rain fell and a strong wind was blowing. When we again set out we found that the streams were quite impassable, and I then decided to try to cross from Elgol. I came back to Sligachan, and from there wired to Elgol asking if I could get across to Soay from there. While waiting for the reply I had again to change my tires, borrowing one from a passing car. I received a reply from Elgol that it was impossible to cross to Soay that day.

Deaths in Other Countries

Sir **Herbert L. Maitland,** senior surgeon, Sydney Hospital, Sydney, Australia, May 23, aged 55.—Dr. **Ramiro da Rocha Magalhães,** Rio de Janeiro, one of the founders of the Associação Medico-Cirurgica, and on the editorial staff of the *Archivos Brasileiros de Medicina,* aged 44.——Dr. **P. Woithe,** assistant director of the German museum of hygiene at Dresden, author of several practical contributions to laboratory technic and epidemiology.——Dr. **Monard,** consulting physician at Aix-les-Bains.——Dr. **G. Marchetti,** aged 53, director of a children's hospital at Rome, aged 53.

CORRECTION

Cancer of the Esophagus.—In the paper by Dr. E. A. Graham, THE JOURNAL, June 23, p. 1830, it was said that in the case report by Lilienthal, the patient died after several weeks. Dr. Graham writes that he is informed that in reality this patient lived one year and four months after the operation.

Foreign Letters

LONDON

(From Our Regular Correspondent)

July 21, 1923.

The International Congress of Surgery

The sixth International Congress of Surgery, held in London, July 16-20, was well attended by the surgical leaders of all civilized countries (to the number of twenty-six) except Germany, which was excluded. Among American surgeons present were Drs. W. W. Keen, W. J. Mayo, G. W. Crile, Abbott, Andrews, Balch, Brinsmade, Clark, Frazier, Freeman, Lovett, Evans, Parker, Hitchens, Truesdale, Hupp, Stillman, Halstead, MacAusland, McArthur and McWilens. Canada was represented by Drs. A. H. Bruce, Eberto and Banting. At the inaugural session the president, Sir William Macewen, F.R.S., occupied the chair. The Prince of Wales, in a graceful speech, opened the congress. He welcomed "the distinguished surgeons of the world to the country of Lister, who revolutionized the art of surgery by the application of the discoveries of Pasteur." He extended a special welcome to Dr. Keen, "who carried his eighty-six years so lightly." Lord Curzon, secretary of state for foreign affairs, and Mr. Chamberlain, minister of health, also expressed satisfaction at the holding of the congress and welcomed the guests.

THE ANTLER OF THE DEER AND ITS RELATION TO THE GROWTH OF BONE

In his presidential address, Sir William Macewen expressed the opinion that physicians concentrated their studies too much on human phenomena, to the exclusion of life as a whole. The so-called divisions of Nature were purely arbitrary conveniences having no existence except in our minds, for, after all, we were but a bit of Nature, and everything pertaining thereto must have a bearing on humanity. Comparative anatomy and physiology tended to illuminate the obscure problems of structure and function in man. The phenomena of the growth and shedding of antlers threw light on the growth of bone in man. The frontal bone from which the antler grows, in some species to an immense size, in three months, is covered only by pericranium, to which even "the orthodox school" does not assign osteogenic powers of a high order. The method of growth was somewhat analogous to the growth of bone at a single epiphysis. In a few months more the antlers underwent sclerosis and death. Metchnikoff believed that old age was not brought about simply by arrest of the reproductive power of the cells but by impairment of the phagocytes and invasion by germs introduced from the large intestine. But in the death of the deciduous stag's horn none of these factors obtained; the whole process was aseptic. The death of the bone was due to osteoblastic formation encroaching on the lumens of the vessels and producing ischemia. There was no senescence in the cells of the antler; they all died young. A definite type of cell was recognizable in the mature osteoblast of the antler. This was contrary to the opinion held in regard to the mammalian osteoblast in general, which was said to be definable only by function. In man in the growing epiphysis and in the repair of bone the osteoblasts were also characteristic. Some histologists held that all forms of mesoblastic tissue were interconvertible—that primitive connective tissue might develop into fibrous tissue, cartilage or bone. From his observations, Sir William had found no evidence of the existence of such an indifferent or elusive tissue. Periosteum could not produce a single osteoblast. The bone cell was derived from tissue primarily osteoblastic, which produced only osteoblasts. Living osteoblasts could be carried by the blood stream. In a case of fracture of the humerus, a spiculum penetrated the brachial artery, allowing the blood, flowing over the bare fractured bone, to escape into the tissues. An aneurysm formed with a sac containing plaques of bone. They evidently formed from osteoblasts carried away by the blood stream. Sir William referred to his earliest case of bone graft, in a boy, aged 3, who had necrosis of the humeral shaft from pyogenic osteomyelitis. He came under observation forty years ago. The loose dead bone was removed and, as belief in the periosteum as a bone producer was then in vogue, it was hoped that bone might form from it. This did not take place, and the wound healed, leaving the arm without a shaft. A year later his mother demanded amputation, as the arm was worse than useless. Instead, six pieces of bone removed from six different legs, for correction of deformity of the tibiae, were divided into small pieces and inserted between the muscles, where the humerus ought to have been. These fragments became firmly united to one another and to the epiphyses, so as to form a solid shaft. The man had a shortened but useful arm, being able to work as a joiner. He took part and did his duty in the Great War.

THE SURGERY OF THE ENDOCRINE GLANDS

The rapid development of endocrinology rendered the discussions on this subject the most important of the congress. Victor Veau of Paris opened with a paper on the thymus. He referred to three types of operation for hypertrophy. Fixing the organ in the substernal space had not been satisfactory, perhaps because respiratory movements were too great. The next type of operation was resection of the manubrium with or without thymectomy. The latter was not justifiable, as the trouble was from hypertrophy and was not due solely to anteroposterior compression. Removal of the manubrium after thymectomy should be reserved for cases in which it had been impossible to resect totally the superior pole of the adherent gland. Subcapsular thymectomy—an easy procedure—was the routine operation and gave excellent results. Ablation of the thymus did not interfere with growth, as only the superior pole was removed. Roentgen rays had proved curative without operation. If a physician suspected hypertrophy of the thymus, he should send the patient to a radiologist; but if, after one or two applications, the symptoms persisted, thymectomy should be done. Some cases of rapid death after their application had been described. If those accidents became frequent, surgery would take back its rights.

THE SPLENIC SYNDROMES

Dr. W. J. Mayo said that the spleen was chiefly a mechanical filter, removing from the blood degenerated red cells and toxic agents above colloid size. It sent them on to the liver for further detoxication; it also developed lymphocytes. While the function of the normal spleen was not important, the diseased spleen was a serious menace to the constituents of the blood and liver. The spleen did not initiate the pathologic processes with which it was concerned, but acted as a secondary agent. Its removal in the splenomegalies and in certain blood states got rid of a pathologic agent and broke a vicious circle. A chronically enlarged spleen which did not yield to medical treatment should be removed early unless there were contraindications. In all, 295 splenectomies had been performed in the Mayo Clinic, and all the deaths were classified as due to the operation. Those splenomegalies due to microbes gave these results:

	Number	Deaths	Results
Chronic syphilis	8	1	Good in 7
Tuberculosis	4	1	Good in 3
Pyogenic organisms.....	14	4	Good in 6
Splenic anemia	82	9	Good in majority

For other conditions, the results were: Hemolytic icterus; forty-two splenectomies, with one death and forty perfect recoveries. Pernicious anemia; fifty-seven splenectomies, with three deaths in the hospital, but none among the last forty patients prepared by blood transfusion, and the improvement was more prolonged than that following transfusion alone. More than 10 per cent. lived more than five years, and 22 per cent. more than three years after the operation. There were no cures, but the abnormal blood picture improved. Splenectomy was justified only in a limited number of carefully selected cases. Elderly patients and aplastic types should be excluded. Polycythemia rubra vera; one splenectomy with great improvement. Hemorrhagic purpura (essential thrombohemia), one splenectomy in advanced stage; good recovery. Splenomyelogenous leukemia; in twenty-nine splenectomies, one death, and great temporary benefit in twenty-eight. Six alive and able to work, one more than six years after operation. Blood condition improved—less anemia and less evidence of toxemia.

SURGERY OF THE SUPRARENALS

Willems of Liége and Goormagtigh of Ghent said that the excision of one of the healthy suprarenals, with the idea of lessening the amount of suprarenal substance, had been performed, especially for epileptic fits, as some physiologists believed that the convulsions depended, not on the central nervous system but on the endocrine glands. The results obtained were interesting, but the problem was far from being solved. The suprarenal had also been removed for hypertension. Of the two methods of removal, the transperitoneal was not handiest. The retroperitoneal was better, being more accurate and giving the required view. Mr. F. C. Pybus of Newcastle-on-Tyne reported a successful case of suprarenal grafting for Addison's disease. The patient had been discharged from the hospital as incurable, and was at the point of death. The graft was obtained immediately after death from a healthy man, killed by accident, and was immediately inserted into the subcutaneous tissues of the patient. The blood pressure rose, pigmentation disappeared, muscular power was restored, and the blood picture, which had been that of pernicious anemia, returned to normal. The patient was able to return to light work for three years, when the symptoms recurred and fresh grafting was performed. No trace of the original graft could be found. In a second case the attempt to graft the suprarenal from a male on a female failed. Two attempts to graft the pancreas into diabetic patients were also unsuccessful, though in one case there was slight transient diminution of the glycosuria.

TESTICULAR GRAFTING

Dr. Serge Voronoff of Paris read a paper and exhibited a cinematograph film of his results, which attracted great attention not only from the members of the congress but also from the lay press. He said that in the Collège de France he had obtained durable thyroid and ovarian grafts, and more especially testicular grafts. Owing to the difficulty of obtaining human material, he had utilized the testes of monkeys on account of their close relation to man. He had performed many experiments on animals with a view to finding a method to insure long survival of grafts. At present he had in man two cases dating back two years and nine months; two, two years and seven months, and one, two years and eight months. In all, the effect of the hormone of the grafted testis was very apparent, not only in the subjective appreciation of the patients but also in physiologic phenomena which could be tested objectively. These included lowered blood pressure, loss of weight in the obese from improved metabolism, better vision in hypermetropic patients from increased tonicity of the lens and accommodative muscles, new growth of hair, and increased muscular power, as shown by the dynamometer. When transplanted, the testis rapidly died unless the circulation was quickly restored in the new organism. It must not be grafted in a single mass; otherwise the capillaries did not penetrate beyond the periphery of the gland, and the center became necrotic. Fragmented grafts must be used. On the other hand, the error must not be committed of making the fragments too minute, as these would be rapidly absorbed. The testis of chimpanzees and cynocephalic monkeys usually provided six fragments for grafting. The region of implantation should be capable of providing capillaries or a serous exudate rapidly. He invariably failed to produce permanent grafts under the skin or within muscles or the peritoneum. After many experiments he discovered that the best region for grafting the testis was the external or, preferably, the internal surface of the tunica vaginalis. The reasons were that the tunica was vascular, and serum was exuded from it immediately after grafting as a result of operative irritation. The six fragments should be distributed between the two vaginal tunics—three for each. They should not be in contact with one another. Each fragment was anchored at each end by a catgut suture and was everywhere in contact with the vascular surface of the tunic. The surface on which the graft is placed must be lightly scarified in order to produce congestion. Fragments cannot always be introduced within the serous cavity of the tunic, but may be readily introduced when it is distended with fluid, which is usually the case after the age of 50. If the tunic is closely adherent to the testis, the fragments may be grafted on its external surface. Grafts from young monkeys which had not reached puberty were not successful, as they did not provide the hormone. Voronoff considered nothing more natural than to provide thus for insufficiency of the testicular hormone, whether due to the physiologic phenomena of old age or to pathologic changes. He had operated on forty-four patients, of whom six were physicians. For three months there was no appreciable effects, and the physicians scoffed; then improvement began. Mr. Ivor Back of London said that he had seen Dr. Voronoff's work and talked with his patients, particularly the physicians. He corroborated his claims, and was convinced of the value of testicular grafting.

THYROID TRANSPLANTATION

Dr. Albert Kocher of Berne said that he had performed thyroid transplantation in 214 cases, with only 14 per cent. of failures. Following his father, the late Professor Theodor Kocher, he considered the operation suitable for slight cases of thyroid deficiency, and preferable to thyroid medication. The most refractory cases were those of congenital absence of the thyroid, but three out of ten such cases were improved, one patient sufficiently to take a university degree. The method was to implant fragments of human thyroid not larger than a cherry, taken preferably from the upper pole of an exophthalmic goiter, into the peritoneum, where they were fixed by suture, or into the medullary cavity of the tibia. Thyroid should be taken before and for a short time after the operation, or the graft would not survive, because of the demand made on it. About half the patients had to supplement with thyroid after the operation, although the quantity required was reduced.

THE USE OF INSULIN IN SURGERY

Dr. F. G. Banting of Toronto said that insulin could have no effect on diabetic gangrene, as this was due to arterial change. But it would render the subject sugar-free and permit operation for gangrene or for any surgical condition, such as appendicitis, in a diabetic patient.

AN ELECTROCHEMICAL INTERPRETATION OF SHOCK AND EXHAUSTION

Dr. George W. Crile of Cleveland said that there was much evidence that animals were electrochemical mechanisms constructed on the pattern of the constituent cells, each of which in itself was an electrochemical mechanism. Cells would thus have the power of oxidation only as long as there was a difference in potential between the nucleus and the cytoplasm, the latter being negative. A difference in potential was maintained as long as there was oxidation. The brain, as compared to the liver, was positive. As electricity flows from a higher to a lower potential, and oxidation in the brain is the highest, we may suppose that the oxidation electric wave passes down the nerves from the high potential of the brain to the lower potential in muscles and glands; and since the liver has the lowest rate of oxidation, and hence the lowest potential, the current would finally reach it, whence it would return through the electrolytic system to the brain, thus completing the circuit. This electrochemical theory would interpret a number of facts. Among these are the interference with digestion by the strong emotions, injury and pain, for the splanchnic processes are inhibited while the brain is stimulated; the failure in health under the stress of chronic fear, anger or strong emotions; the essential function of sleep as the period during which the difference in potential in the batteries that drive the organism, which has been decreased by the activities of the day, is restored, and the fact that in surgical operations, if a state of negativity and the internal respiration are maintained, there will be no surgical shock. The state of negativity is maintained by exclusion of fear by management, of traumatic stimuli by local or regional anesthesia and of stimulation. The entire process whereby the state of negativity is secured and the internal respiration —difference in potential—of the cells is maintained is included in the surgical technic of anociation. The internal respiration is maintained by fluids, warmth, blood transfusion, rest, sleep and the avoidance of deep inhalation anesthesia.

SEROTHERAPY AND VACCINOTHERAPY IN SURGERY

Dr. A. Parker Hitchens of Washington said that serums and vaccines were developed on the theory of strict specificity, but a factor in clinical improvement had been discovered which was not always clearly due to specific reactions. Of the bacteria important to the surgeon, the streptococcus held the first place. In the treatment of acute streptococcic infections, antistreptococcus serum was not dependable, and probably was devoid of specific value. Antigonococcus serum, so promising theoretically, gave results that were not dependable and were not clearly specific. The favorable results from the early use of antianthrax serum seemed to warrant its use in large doses. Excepting such infections as diphtheria, which were only incidentally of surgical importance, there was no surgical disease of bacterial origin for which there was a serum of sufficient value to warrant discussion. In the popularization of vaccines, it was not realized that injection of the antigen may constitute a comparatively unimportant part in the production of immunity. Even if bacteriotropic substances were produced, it did not follow that they would be brought into effective contact with the bacteria. The infection itself was probably the result of some condition which interfered with such contact. Possibly nonspecific protein shock accomplished this. Inability to control the degree of shock was responsible for the little progress along this line. The only surgical infections which seemed regularly amenable to vaccine therapy were those caused by the staphylococcus. In general, the superficial infections due to it responded well to the vaccine. The chief obstacle in attempting to estimate the value of specific serums and vaccines lay in the fact that in few reports was the infection considered not only surgically and clinically, but also histologically, bacteriologically and immunologically.

SOCIAL FUNCTIONS

The social functions of the congress were a great success. They included receptions at the mansion house by the lord mayor and the lady mayoress, at the Royal Society of Medicine by the president of the congress, at the Royal College of Surgeons by the president, and at the Royal College of Physicians by the president, and a banquet. For the ladies, who accompanied the members, in addition to the receptions mentioned, an ample program of excursions, to visit some of the principal places of interest in London, was arranged.

A Section of Comparative Medicine at the Royal Society of Medicine

A new section—that of comparative medicine—has been formed at the Royal Society of Medicine, the membership of which is open to veterinary surgeons as well as to physicians. For many years Sir Clifford Allbutt has pleaded for the wider outlook which would result from a study of comparative medicine, and for the cooperation in investigations of those engaged in the two professions. Therefore, most appropriately, he will be the first president of the section. The council is composed of leading men, half representing human medicine and half veterinary medicine.

PARIS

(From Our Regular Correspondent)

July 13, 1923.

International Congress on the Propagation of Social Hygiene Instruction

A congress, organized by the national committee for the dissemination of information on social hygiene and prevention, was opened at Paris by J. L. Breton, senator and former minister of public health. The program included several subjects that merit particular attention:

INSTRUCTION IN SCHOOL AND AFTER

The congress adopted a resolution demanding that instruction in hygiene be given systematically and authoritatively in a manner agreeable to the instructional corps of the school or college, and with due care and prudence in regard to sexual topics. All forms of appeal to the eye and the ear may be employed: meetings, motion pictures, pamphlets, tracts, posters, popular lectures on hygiene, newspapers and magazines. It is of the utmost importance that from the time they enter school and throughout the whole course of school life, children should receive practical training in hygiene. This instruction may be concluded during the last year of school by a theoretical and practical course given by the school physician.

SEXUAL INSTRUCTION

The congress held that instruction in sexual topics should not be made a special subject of the school curriculum. Knowledge of sexual matters should be imparted in connection with the subjects with which it is naturally associated, such as the courses in natural history, hygiene, prophylaxis and ethics. Given in this way, sexual education may begin with the first awakening of intelligence, and may be continued through the various stages of development. Sex education should be regarded as the joint duty of the family and the school. The first instruction should be given in the family. At the time of puberty, it is essential that rational and detailed biologic instruction be given; this alone can be relied on to train the sexual instinct and to assure its evolution in accordance with the demands of physical and moral health. In secondary schools for boys this instruction should include: (1) lessons in ethics or morals, combined with

lessons on the consequences of alcoholism, the moral and social responsibility incurred in the transmission of venereal diseases, and the necessity of continence in order to safeguard not only individual health but also that of one's future wife and family, and, consequently, the future of the human race; (2) lessons in biology, including the study of the organs and functions of reproduction in man and animals, which will link themselves naturally with lessons on related functions, such as nutrition; this instruction will fill that mysterious and pernicious gap that is usually left in school courses and textbooks; (3) lessons in prophylaxis, given by the school physician, which might take as their basis the brochure of the late Professor Fournier, "For our sons when they reach the age of 18."

These lessons will include the following subjects: a description of venereal diseases, personal and social prophylaxis, the dangers of prostitution, and the superiority of continence over other prophylactic measures. It will be well to include these lessons in the course on hygiene, which would be transferred from the professor of natural history to the physician of the institution. In secondary schools and colleges for girls, sexual education should be introduced in the form of a course in the anatomy, physiology and hygiene of the female generative organs, including the essential ideas of prophylaxis, which would serve quite conveniently as a preface to a course in child culture, such as has been established for a number of years.

CENTERS OF PREVENTIVE MEDICINE

Dr. Schreiber read a paper on the need of centers of preventive medicine. These dispensaries have been established for the medical examination of subscribers, life insurance policyholders, employees and others with the purposes of discovering latent or unsuspected lesions, drawing attention to errors in hygiene and furnishing information as to how to prevent the contraction or the extension of disease. They do not treat the persons who apply, but merely supply a detailed certificate setting forth the condition of the various organs. The examinees are then turned over to their private physicians for treatment.

An International Confederation of Brain Workers

About three years ago, a confederation of intellectual workers was established in France for the purpose of representing, coordinating and defending the interests of men and women who derive their principal support from mental work instead of from manual labor or from revenue on property holdings (THE JOURNAL, May 8, 1920, p. 1339). Similar societies having been formed in other countries, the delegates from the French confederation and from five foreign countries (Belgium, Bulgaria, Finland, Great Britain and Switzerland) met recently in Paris and established the International Confederation of Intellectual Workers. The secretary has been empowered to draw up a constitution and by-laws, which will be sent for examination to the national confederations and will be submitted at the December session of the international body. The principal subjects for discussion at this session are: intellectual property (recognition of such property in all countries in which it is not yet recognized; its protection), and the creation of scientific property.

An Incident at a Recent Competitive Examination

At a recent competitive examination for the choice of agrégé professors of surgery, an incident occurred which has caused considerable stir. The professor who was chairman of the examining board opposed the appointment of a certain candidate on the ground that he had committed an error in diagnosis in one of the competitive tests. As the other members of the board did not support his view, the chairman resigned, and addressed a letter to the minister of public instruction. An operation performed a few days later on the patient in question confirmed the opinion of the candidate and refuted that of the chairman of the board of examiners. This incident has led to sharp criticism of the present system of competitive examinations, in which chance plays too big a part. If the subsequent operation had not demonstrated that the examiner and not the candidate was in error, the latter would certainly have been rejected. It has also been urged that a competitive examination in which all candidates are not given identical tests cannot be regarded as equitable.

Honor Loans to Students

Léon Bérard, minister of public instruction, has received a delegation of presidents and representatives of sixteen associations of men and women students of Paris. The delegation handed the minister a copy of a resolution passed at a conference of these associations, endorsed by more than 10,000 students of the University of Paris. This resolution requested that the administrative council of the National Bureau for the Allocation of Honor Loans, which was created by the act of 1923, be composed of seven students, to be chosen by the whole student body, in accordance with rules already established in regard to their representation on the councils of the university.

Regulation of Cemeteries

The rules and regulations pertaining to the management of cemeteries in France date back more than a century. They take no account of the nature of the soil, but merely establish within what distance from human habitations new cemeteries may be created; the minimal period of rotation—that is, the time that must be allowed to elapse before a given terrain may be again plotted for new graves, and the zone within which no buildings may be erected and no wells dug, without special authorization. M. Paul Strauss, minister of health, has recently sent a circular letter to all the prefects of France, in which he points out the need to take into consideration the geologic nature of the soil. He emphasizes that the completeness and rapidity of combustion of interred bodies depend on the composition of the soil. Combustion proceeds best in light soils, with a permeable subsoil, which air and water can penetrate and in which water is not retained for any length of time; on the other hand, decomposition is slow in soils that are constantly saturated with water. Therefore, in the future, when a commune desires to establish, enlarge or change a cemetery, the prefect should be advised of the fact and the commune should pay for the expert opinion of a geologist. After his opinion has been secured, the matter should be submitted to the departmental council on public health, and if that council approves the project, the plans could be turned over to the minister of the superior council on public health, which would render the final decision.

Death of Dr. J. Marcorelles

The death of Dr. Marcorelles, surgeon to the hospitals of Marseilles and formerly professor at the Ecole de médecine of that city, at the age of 83, has been announced.

A Memorial to Professor Chantemesse

At Puy (department of the Haute-Loire), a commemorative tablet was recently affixed to the house where, Oct. 13, 1851, Professor Chantemesse was born. The ceremonies took place under the chairmanship of M. Paul Strauss, who was aided by Dr. Louis Martin, assistant director of the Pasteur Institute at Paris. At the *lycée* of Puy, Chantemesse became an intimate friend of Dr. Raux, who later presented him to

Pasteur. He was one of Pasteur's favorite pupils and later became his physician, serving in that capacity during Pasteur's last sickness (1895).

Personal

At the latest meeting of the Academy of Medicine, Dr. Antoine Depage, professor of surgical pathology at the University of Brussels, was elected foreign associate member, while Dr. Harvey Cushing, professor of surgery at Harvard University School of Medicine, and Dr. Segura, professor at the Buenos Aires College of Medicine, were chosen foreign corresponding members.

BERLIN

(From Our Regular Correspondent)

July 7, 1923.

Disease Statistics of the Health Insurance Societies

At the latest session of the Berlin Gesellschaft für öffentliche Gesundheitspflege, Dr. Teleky, provincial health officer for the industries, of Düsseldorf, raised the question, "For what purpose and in what manner should the disease statistics of the health insurance societies be kept?" His remarks were based on the assumption that medical statistics have no inherent or direct practical value but serve only certain remote practical purposes. Thus, for instance, statistics on the causes of death have exerted an important influence on the campaign against infectious diseases, since they were responsible for the introduction of compulsory notification of diseases. For many decades, statistics have been collected on the diseases occurring in those insured in health insurance societies, but, on the whole, they have been of no value to the general public. Only in the case of a very few large societies have the statistics ever been analyzed. But the analysis of the statistics of a few health insurance societies cannot give a survey of the diseases of the whole population, since the societies constitute only a part of the population—in Berlin, 30 per cent. of the men and 40 per cent. of the women—and, furthermore, only those diseases that cause incapacity for work are covered by statistics. From a study of these statistics we can reach certain practical conclusions on industrial hygiene, provided the statistics are arranged according to industries and trades or callings and reflect deficient sanitary conditions in certain places. What is needed, however, is a uniform application by all health insurance societies of principles that are adapted to these purposes. Under the leadership of Teleky, a rationalized schema has been worked out by a committee composed of physicians, statisticians and representatives of the trade unions, and is being applied in the governmental district of Düsseldorf. Difficulties have arisen in differentiating the various trades, since the local health insurance societies declared that they could differentiate only between the industries. But the various industries include many different trades and crafts. Nevertheless, an approximately correct idea is given, since experience shows that 80 per cent. of those employed in an industry are members of definite trades. Twenty different trades have been distinguished, which is sufficient for all kinds of health insurance societies. Deciding on a list of diseases was found to be more difficult, but finally twenty-one pathologic groups were selected. In determining the classification, the anatomic and etiologic bases of the diseases and the manner in which physicians are in the habit of reporting the diagnosis in the sick certificates, which are often couched in veiled terms, were duly considered. An alphabetical list of trades and diseases lightens the clerical work of the health insurance societies.

In the critical interpretation of the results of statistics, social and economic conditions must be considered, since the diseases associated with incapacity for work are dependent on such factors as the size of the sick benefits, lack of employment, and strikes. With reference to the mortality statistics, it should be noted that some deaths are not recorded, since some policies, on account of the fact that the period of assistance to which the holders were entitled has expired, have been previously canceled. If the period of assistance is twenty-six weeks, about 20 per cent. of the patients are dismissed before recovery. What is really needed is statistics on the mortality in various trades, such as are published every ten years in England. But Germany's financial condition at present precludes any such innovation. The age distribution in the trades would be of some value, but if that is begun it should be noted whether a given trade is of recent origin; for instance, the rubber industry, which has developed to its present wide extent mainly in connection with automobiling and therefore employs more young persons than the older industries.

New Legislation on Juvenile Courts

A new law pertaining to juvenile courts was promulgated by the reichstag, a few months ago. Some changes are worthy of note. The age of criminal accountability has been raised to 14. A juvenile is not accountable for a crime if "at the time the deed was committed, his mental and moral development was such as to render him incapable of recognizing the unlawfulness of his act or of controlling his will in accordance with his insight." The maximum of certain forms of punishment has been reduced. In lieu of punishment, certain educational training may be substituted at the discretion of the court. In regard to the forms of punishment, certain general rules have been set up; for instance, the punishment of a juvenile must be carried out in such a manner that his educational training is thereby furthered. Juveniles must not be allowed to mingle with adults. If juveniles are sentenced for longer periods, they must be confined in separate institutions. Ample provision is made for suspension of sentence and the establishment of a period of parole under court supervision and the final remission of penalties in view of continued good conduct. Section 2 of the law provides for the creation of special juvenile courts, it being especially stipulated that, in all cases in which juveniles are involved, the *Schöffengericht* (justice's court) shall have sole jurisdiction. For serious crimes, the *Schöffengericht* is enlarged so as to include two judges and three laymen. The transactions are not public—a change that has been long eagerly desired. The mode of cooperation of the juvenile welfare bureau, to the problems of which, according to the federal act regulating the juvenile welfare service, the juvenile court service belongs, together with its participation in the work of the private juvenile welfare societies, are regulated by several sections of the law. The law went into effect, July 1, 1923.

Excess of Deaths Over Births

The number of births in the large cities of Germany is very small, this year. During the first quarter, January-March, it was only 16 per thousand inhabitants, on a yearly basis. If we divide the cities into seven groups, we find that Berlin, with 3,990,000 inhabitants, had the smallest number of living births (exclusive of transient residents); namely, only 10.7. The second lowest number was in the industrial region on the Rhine and the Main, including Frankfort, Mannheim, Mainz, Wiesbaden and Ludwigshafen, the registration being 14.2. The third lowest number was recorded in the Saxon industrial section, including Dresden, Leipzig, Chemnitz and Plauen (15.3). The five south German cities Munich, Nuremberg, Stuttgart, Augsburg and Karlsruhe follow (15.4). The seven large seaport towns rise above the average for the

empire (16.4). The seven north German cities Breslau, Hanover, Magdeburg, Halle, Kassel, Brunswick and Erfurt made a very good showing (17.2), but the best record was reported from the Rhine-Westphalian industrial center (21.5). In Berlin the birth rate (10.7) had fallen so low that it is far exceeded by the mortality rate (14.7).

Seventieth Birthday of Professor von Gruber

Professor von Gruber, hygienist, of the University of Munich, celebrated his seventieth birthday, July 7. He was a pupil of Pettenkofer, but he studied also under Voit and Naegeli. He was a fellow student of Rubner and Hans Buchner. In 1882, at the age of 29, he became an instructor in hygiene in Vienna (he is a native of Austria). In 1884 he was called to Graz as an assistant professor of hygiene. He became director of the Hygienic Institute in Vienna in 1887. In 1902, at the death of Buchner, he removed to Munich. Gruber has published a large number of treatises on chemistry, physiologic chemistry, bacteriology and general hygiene. The work on agglutination, which he published in collaboration with Durham in 1896, afforded the basis for Widal's test for the diagnosis of typhoid. Among his works on general hygiene may be mentioned those on water supplies. He published a long article on medical statistics in the "Handbuch der Hygiene," which he edited in collaboration with Rubner and Ficker. In 1893, in a special work, he gave his ideas on needed reforms in the construction of dwellings. The draft of a law to regulate trade in foodstuffs in Austria was also from his pen. With the psychiatrist Kraepelin, he was active in the campaign for the suppression of alcoholism. Eugenics or race hygiene also found in him an earnest advocate.

Death of Professor Hess

The esteemed director of the Munich University Eye Clinic, Professor von Hess, has died of pernicious anemia, after a short illness, at the age of 60. He was an assistant of the physiologist Hering and of the ophthalmologist Sattler. He became an instructor in the university in 1891. In 1896 he was offered a chair in the University of Marburg; in 1900 he was called to Wurzburg, and in 1912 to Munich. Among his numerous works, those on physiologic optics deserve special mention. In recent years he has been engaged more particularly with the comparative physiology of vision. He has published also some highly interesting researches on color vision in insects. In addition, he has been carrying on significant studies on the mechanism of color vision in man.

Marriages

HUDSPETH ELLET SCOLES, Swansea, Ariz., to Miss Bernice Melrose Wilson of Takoma Park, D. C., August 5.

ALICE BARKER ELLSWORTH, Long Beach, Calif., to Mr. Hasworth Bonfield of San Diego, July 10.

JACOB ROSCOE HARRY, Chicago, to Miss Helen Louise Hurley of Mount Carroll, Ill., July 28.

PATRICK R. MINAHAN, Green Bay, Wis., to Miss Gladys M. Stowe of Oakfield, June 21.

CHARLES WORTH NORTON to Mrs. Alice Josephine Allen, both of Los Angeles, July 20.

GUNNAR GUNDERSON to Miss Mary C. Baldwin, both of La Crosse, Wis., June 23.

WILLIAM C. HANSON to Mrs. Rose Behnken-Houg, both of Racine, Wis., June 25.

VICTOR WILLIAM PURDY to Miss Rhina A. Steins, both of Milwaukee, July 18.

BENJAMIN JAFFEE BIRK to Miss Ruth Markwell, both of Milwaukee, July 7.

OWEN C. RIGBY to Miss Lena Townsend, both of Shreveport, La., June 20.

Deaths

George Nicholas Acker ⊕ Washington, D. C.; Medical Department of Columbian University, Washington, 1874; University of Berlin, Germany, 1877; member of the American Pediatric Society; formerly demonstrator of practical physiology, pathology and histology, and professor of physiology, Medical Department of Columbian University; professor of pediatrics, George Washington University Medical School; on the staff of the Children's Hospital; aged 70; died, July 22, of pneumonia.

Charles Law Lang, Cato, N. Y.; Michigan College of Medicine, Detroit, 1883; Medical Department of Columbia College, New York, 1884; member of the Medical Society of the State of New York; aged 64; died, July 15, at the Clifton Springs (N. Y.) Sanitarium, following an operation for gallstones.

William Lee Wood, Portland, Ore.; St. Louis (Mo.) Medical College, 1886; member of the Oregon State Medical Association, and the Pacific Coast Oto-Ophthalmological Society; formerly on the staff of the Good Samaritan Hospital; aged 59; died, July 15, at Monrovia, Calif., following a long illness.

George Hiram Wilson, Baltimore; Kansas City (Mo.) Homeopathic Medical College, 1900; Hahnemann Medical College and Hospital of Philadelphia, 1903; served in the M. C., U. S. Army, during the World War; aged 42; died, July 12, of carcinoma of the stomach.

Clay Emery Giffin ⊕ Boulder, Colo.; University of Colorado School of Medicine, Boulder, 1908; formerly instructor of surgery at his alma mater; member of the Radiological Society of North America; aged 41; was drowned, July 22.

Ralph Alexander Dalbey, Youngstown, Ohio; Western Pennsylvania Medical College, Pittsburgh, 1898; served in the M. C., U. S. Army, during the World War; aged 46; was found dead in his office, June 20, of heart disease.

James Arthur Miller, Pomeroy, Ohio; Starling Medical College, Columbus, 1891; member of the Ohio State Medical Association; county health officer; aged 54; died, July 20, of bullet wounds received when shot by an insane patient.

Richard Robert Shapard, Anson, Texas; Vanderbilt University Medical Department, Nashville, Tenn., 1887; member of the State Medical Association of Texas; aged 65; died, May 18, at Fort Worth, following an operation.

Oscar Eve Jones ⊕ Newport, Ark; Vanderbilt University Medical Department, Nashville, Tenn., 1902; served in the M. C., U. S. Army, during the World War; aged 44; died suddenly, July 14, of heart disease.

William Clark Marsh ⊕ Albion, Mich.; University of Michigan Medical School, Ann Arbor, 1883; formerly member of the city council and board of education; aged 67; died suddenly, July 23, of heart disease.

Charles Miller Alexander, Coleman, Texas; University of Louisville (Ky.) Medical Department, 1882; member of the State Medical Association of Texas; aged 66; died, May 13, at Temple, following an operation.

Arthur McDowell Duncan, Glendale, Calif.; Bellevue Hospital Medical College, New York, 1878; member of the Medical Society of the State of California; aged 73; died, July 17, of heart disease.

Wildridge Goldsmith Terry, Henderson, N. Y.; Bellevue Hospital Medical College, New York, 1876; aged 68; died, July 17, at the Hospital of Good Shepherd, Syracuse, following a long illness.

David Edward Mundell, Kingston, Ont., Canada; Queen's University Faculty of Medicine, Kingston, 1886; professor of principle and practice of surgery at his alma mater; aged 59; died, June 11.

L. Lorenzo Artis, Smyrna, Del.; Hahnemann Medical College and Hospital of Philadelphia, 1904; member of the Delaware State Medical Society; aged 40; was drowned in Como Lake, July 16.

George Albert Carson, Mount Vernon, Iowa; Rush Medical College, Chicago, 1890; aged 59; died, July 23, of a self-inflicted bullet wound in his brain, while suffering from ill health.

Martin Luther Moyer, Hillsboro, Ill.; College of Physicians and Surgeons, Keokuk, Iowa, 1880; member of the Illinois State Medical Society; aged 73; died, July 24, of paralysis.

Arlington Cecil Jones, Covington, Va.; University of Virginia Department of Medicine, Charlottesville, 1894; member of the Medical Society of Virginia; aged 51; died, July 15.

Theodore Byron Wood, Chicago; Rush Medical College, Chicago, 1895; member of the Illinois State Medical Society; aged 53; died, August 2, of cerebral hemorrhage.

James N. Minetree ✠ Las Cruces, N. M.; Hospital College of Medicine, Medical Department Central University of Kentucky, Louisville, 1903; aged 47; died, July 15.

Robert Bostwick Honey, Ann Arbor, Mich.; Detroit College of Medicine and Surgery, 1892; member of the Michigan State Medical Society; aged 55; died, July 25.

Homer Barksdale Hill ✠ Austin, Texas; Medical Department University of Louisiana, New Orleans, 1878; aged 72; died, July 18, at Orange, of angina pectoris.

William J. Murray, Cincinnati; Medical College of Ohio, Cincinnati, 1868; formerly on the staff of the Good Samaritan Hospital; aged 81; died, May 30, of senility.

Lord Byron Townley, Youngstown, Ohio; Homeopathic Hospital College, Cleveland, 1890; aged 70; died, June 8, at St. Elizabeth's Hospital, of paralysis.

Jacob Clifford Haines ✠ Vincentown, N. J.; Baltimore (Md.) University School of Medicine, 1898; aged 54; died suddenly, June 21, of heart disease.

George Eugene Richards, Chicago; Hahnemann Medical College and Hospital, Chicago, 1879; aged 70; died, July 29, of carcinoma of the stomach.

Clarence Axtell Penman ✠ Beaumont, Texas; Rush Medical College, Chicago, 1910; aged 38; was killed by an unknown assailant, July 25.

Daniel P. Reavis, Francisco, Ind. (licensed, Indiana, 1897); member of the Indiana State Medical Association; aged 78; died, July 16, of senility.

William James Shrewsbury, Brooklyn; New York Homeopathic Medical College, New York, 1881; aged 71; died, July 18, of angina pectoris.

Frank Hatfield Tilden Beck, Crestline, Ohio; University of Cincinnati (Ohio) College of Medicine, 1922; aged 26; died, July 24, of septicemia.

Isaac Covington Watt, St. Louis; Beaumont Hospital Medical College, St. Louis, 1890; aged 65; died, July 18, at Miami, Okla., of paralysis.

Alfred Joseph Deveau, Meteghan, N. S.; Dalhousie University Faculty of Medicine, Halifax, 1912; aged 35; died, June 9, of typhoid fever.

Charles Eli Jarvis, London, Ont., Canada; Queen's University Faculty of Medicine, Kingston, 1882; aged 64; died suddenly, June 11.

John H. Pryor ✠ Buffalo; University of Buffalo Department of Medicine, 1882; aged 64; died suddenly, July 21, of heart disease.

Robert William Bell, Toronto, Ont., Canada; McGill University Faculty of Medicine, Montreal, Que., 1873; aged 72; died, June 9.

John C. Adkins, Marion, Ind. (licensed, Indiana, 1897); Civil War veteran; aged 80; died, July 15, of cerebral hemorrhage.

Walter A. Bell, Farmersville, Texas; University of Alabama School of Medicine, Tuscaloosa, 1874; aged 72; died, July 18.

Robert L. Souder ✠ Ada, Ohio; Detroit (Mich.) Medical College, 1875; aged 72; died, July 19, following a long illness.

James Flournoy Shannon, Kansas City, Mo.; Meharry Medical College, Nashville, Tenn., 1898; aged 50; died, July 20.

Neil McKendrick, Placentia, N. F.; Cincinnati (Ohio) College of Medicine and Surgery, 1878; aged 71; died recently.

Alonzo H. Tidball, Garrettsville, Ohio; Cleveland (Ohio) Medical College, 1871; aged 91; died, July 31, of senility.

Turner C. Edgington, Stout, Ohio (licensed, Ohio, 1896); aged 81; died, June 13, at Charleston, W. Va., of senility.

Joseph Spalding, Woodstock, Conn.; Medical School of Harvard University, Boston, 1867; aged 77; died, July 17.

Alvin Monroe Davis, Akeley, Minn.; Miami Medical College, Cincinnati, 1874; aged 72; died suddenly, July 15.

Frank B. Bressler, Oak Park, Ill.; Rush Medical College, Chicago, 1889; aged 59; died, July 30, of heart disease.

John Quincy Adams, Dayton, Ohio (licensed, Ohio, 1896); aged 62; died, July 24, at St. Elizabeth's Hospital.

The Propaganda for Reform

IN THIS DEPARTMENT APPEAR REPORTS OF THE JOURNAL'S BUREAU OF INVESTIGATION, OF THE COUNCIL ON PHARMACY AND CHEMISTRY AND OF THE ASSOCIATION LABORATORY, TOGETHER WITH OTHER GENERAL MATERIAL OF AN INFORMATIVE NATURE

C-O-M NOT ACCEPTED FOR N. N. R.

Report of the Council on Pharmacy and Chemistry

The Council has authorized publication of the following report. W. A. PUCKNER, Secretary.

"C-O-M" is the proprietary, noninforming name under which the H. E. Frees Company, Chicago—claiming to be "nationally known chemists and bacteriologists"—exploits a preparation which is claimed to be the solution of magnesium citrate of the U. S. Pharmacopeia but to have the advantage over the official preparation in that it keeps indefinitely.

The advertising for C-O-M contains the unwarranted claim that magnesium citrate is "the one laxative which may be served to children as well as grown-ups." The advertising contains the assertion that "for colds, a half-glass at various times during the day is proper." By the phrase "for pneumonia, influenza, and bronchitis, as prescribed by your physician," it suggests that the use of magnesium citrate is curative in pneumonia, influenza and bronchitis.

The advertising, which is addressed to the public, suggests the indiscriminate and harmful use of laxatives by the statement that children may be kept in "rugged health" by giving a half-glass of C-O-M "whenever they seem indisposed in the least." We read further:

". . . If your head aches, and you feel tired and miserable, your system is clogged and your blood sluggish, you want a quick and easy elimination to relieve that dull, heavy feeling. You want prompt relief from what is recognized as the underlying cause of so much illness. A glass of Com will act promptly and quickly, and will overcome your indisposition."

It is asserted that "everyone should take a glass full of C-O-M at the slightest sign of a body disorder."

The Council refused recognition to C-O-M because (1) the application of a proprietary name to a pharmacopeial article is irrational and a detriment to rational therapy; (2) as a solution of magnesium citrate is readily prepared fresh and of standard quality by pharmacists, the claim for stability is not a sufficient warrant for the use of a proprietary name for an official article; (3) the therapeutic claims for C-O-M are unwarranted, and (4) the advertising propaganda is likely to lead to the excessive and ill-advised use of the preparation by the public.

TWO MORE ELECTRONIC DIAGNOSES

Findings Made by an Osteopath and a Physician

In Saginaw, Mich., there is an osteopath, one Charles C. Cook, who is a disciple of Albert Abrams. Cook, apparently, does not confine his practice to Saginaw, but also takes in the surrounding territory and towns. Not far from Saginaw is Chesaning, Mich., in which there are five licensed physicians. One of the five is Dr. J. J. Blue, who sends us some interesting data. According to Dr. Blue, Osteopath Cook had seriously alarmed one of the doctor's patients by making a diagnosis of generalized carcinoma.

In order to test the diagnostic ability of this disciple of Abrams, Dr. Blue had his patient write to Cook, inclosing a check for $5 and a sample of blood with a request for a diagnosis. In due time came the following diagnosis, written on the stationery of "Physio-Clinical Laboratory of Dr. Charles C. Cook" and signed "Charles C. Cook, D.O." The diagnosis read:

"The following is a report of the diagnosis made from the sample of blood submitted by you.
"Congenital and cryptogenic syphilis.
"Congenital gonorrhea.
"Carcinoma of stomach, small and large intestine, colon, pancreas, kidneys and bladder.
"Epithelioma (not localized).

"Sarcoma of spine.
"Chronic malaria.
"Diabetes.

"That may look like a formidable array of diseases to you but it is not so bad from an Electronic standpoint. I cannot give a prognosis without a personal examination but if all other things are equal your chances for recovery are very good."

One must agree with Osteopath Cook that a person getting a diagnosis of syphilis, gonorrhea, generalized carcinoma, sarcoma of the spine, chronic malaria and diabetes might consider that he had a "formidable array of diseases." It is consoling to learn, however, that the condition is "not so bad from an Electronic standpoint," and that the "chances for recovery are very good."

The interesting fact regarding this diagnosis, however, lies in the fact that the specimen of blood sent to Charles C. Cook was from a perfectly respectable Plymouth Rock rooster, which had been confined in a well-ventilated coop since its birth. The idea of a young rooster of unimpeachable antecedents, suffering from congenital syphilis and gonorrhea appeals to one's risibilities.

Still another "electronic diagnosis," in this case made by Mary W. McManus, M.D., Denver, Colo., was sent to THE JOURNAL by Dr. O. H. Horrall of Sheridan, Wyo. The diagnosis, Dr. Horrall tells us, is of a man who is working and by no means ready to die. Here is what Dr. McManus found the matter with him:

"Diminished resistance. [An Abramsesque euphemism for syphilis.—Ed.]
"Carcinoma of Gall Bladder.
"Streptococcus.
"Sarcoma of both kidneys, right worse.
"Tuberculosis both lungs, upper right and middle left.
"Sarcoma.
"Gall Stones.
"Malaria.
"Pneumonia."

Except for these trifling ailments the man, it seems, is all right.

Correspondence

SULPHOSALICYLIC ACID RING TEST FOR PROTEINURIA

To the Editor:—In employing a new test for proteins in urine, advocated and described by Exton (THE JOURNAL, Feb. 24, 1923, p. 529), my attention was attracted, while adding a specimen of urine to an equal volume of the sulphosalicylic acid solution in a test tube, to the dense precipitate of albumin formed at the line of contact between the two liquids. The specimen and reagent were not intentionally layered—for one was poured, not pipetted, on the other—but, owing to the much greater specific gravity of the latter, coagulation of the protein, which was instantaneous, occurred before agitation and mixing could be effected. The albuminous ring thus produced seems to be identical with that of Heller's nitric acid test.

In the original technic, thorough mixing of reagent and specimen is directed, and final reading of the reaction is based on the general appearance of the mixture, or its optical measurement as to clearness or cloudiness, in comparison with a control mixture of plain water and urine. Although as one of his references to the general subject he states that Roche, proposing the use of sulphosalicylic acid for the detection of albuminuria, layered with a 20 per cent. solution, mention is not made of the ring or contact method in Exton's directions for performing the test; but rather in his summary is the method discredited. Therefore, in view of the following advantages of "layering," I feel warranted in suggesting its general employment, and subsequent evaluation, as a check on, if not a substitute for, the original procedure.

The advantages over nitric acid contact are: (1) finer definition of the precipitate or coagulum; (2) elimination of gas evolution in turbid or decomposed urines, which greatly obscures the reading with nitric acid; (3) freedom from inaccuracies due to clouding of the reaction by mucin and urinary salts; (4) greater dispatch in the handling of chemicals, as nitric acid is very destructive to one's hands and clothing, as well as to other objects with which it might come in contact, and (5) marked positive reactions elicited where nitric acid indicates negatives.

The advantages over "mixing" with sulphosalicylic acid are: (1) greater definition of precipitate; (2) use of control unnecessary, although this could be employed; (3) heating not required, thus eliminating another step in the analysis; (4) freedom from inaccuracies attendant on the comparison of two liquids which vary little in cloudiness, especially when the control is prepared from turbid or decomposed urine; (5) rapidity of executing the qualitative test, and (6) greater accuracy of quantitative readings when only small traces of albumin are exhibited.

With either technic (mixing or layering), readings are greatly facilitated by interposing a dark background between specimens and the light.

LOUIS HANNAH, M.D., Sylvania, Ga.

ELECTRONIC REACTIONS

To the Editor:—I have been much interested in the article appearing in a recent issue (July 28) of THE JOURNAL on the case of carcinoma of the stomach treated by the Abrams method. It is almost exactly a parallel of a case that occurred in Erie a few months ago. The patient refused to be operated on, but allowed an osteopath to let him die in agony by the Abrams route.

The Erie County Medical Society has expelled two members for their refusal to give up their activities in this farce. They, Drs. C. B. Lininger and Ellen Walker-Berry, with four osteopaths, are frantically waving the Abrams banner in Erie. The people are gradually learning, via undertakers and ruptured bank accounts, the "wonders" of the quackery.

R. S. MINERD, M.D., Erie, Pa.
Secretary, Erie County Medical Society.

Queries and Minor Notes

ANONYMOUS COMMUNICATIONS and queries on postal cards will not be noticed. Every letter must contain the writer's name and address, but these will be omitted, on request.

BACILLUS BULGARICUS AND BACILLUS ACIDOPHILUS

To the Editor:—1. Please tell me how to prepare *B. acidophilus* milk, in accordance with the method advocated by Cheplin and Rettger (mentioned in THE JOURNAL, June 30, 1923, p. 1897). 2. My bacteriology makes no distinction between *B. bulgaricus* and *B. acidophilus*, so that I have supposed them identical. My druggist and his wholesaler appear to be as ignorant as I on this point. 3. Years ago one of my friends, a physician, tried out *Bacillus bulgaricus* on himself, and I tried it on my patients. Both of us went back to real buttermilk and buttermilk tablets. I now have a patient on buttermilk and one on *B. bulgaricus* lactose milk. The bacilli are in liquid form, a "suspension," I think. 4. There are usually several children and adults, as well, in need of some pabulum of this character, at this season. If *B. acidophilus* is better, I should appreciate it and pay for a supply sufficient for one patient for at least a month.

H. E. POTTER, M.D., Clifton, Kan.

ANSWER.—1. The following method for the preparation of *Bacillus acidophilus* milk is given by Rettger and Cheplin (*Arch. Int. Med.* **29**:357 [March] 1922): Fresh skimmed cow's milk is sterilized in one heating at from 115 to 120 C, the time required being determined by the volume of the milk and the nature of the container. Quart lots in ordinary glass flasks are heated in from twenty-two to twenty-four minutes. Properly heated milk should have a dark cream color, but

should not be distinctly browned. After cooling to at least 37 C., the milk is inoculated with pure strains of *B. acidophilus* which have been grown, by repeated transfers, sufficiently long in milk to develop rapidly and bring about coagulation of the casein within twenty-four hours at a temperature of from 35 to 37 C. Viable milk cultures of the organism are employed as the inoculum, and at least 10 c.c. of the inoculum is transferred for each liter of milk treated. After thorough mixing, the newly inoculated milk is incubated for the period stated.

2. *Bacillus acidophilus* is microscopically almost indistinguishable from *Bacillus bulgaricus*. According to Rettger and Cheplin in the publication referred to, there are these points of distinction between the two organisms: *Bacillus acidophilus* produces relatively little acid in milk (less than 1 per cent.), whereas *Bacillus bulgaricus* may produce as much as 3 per cent. *Bacillus acidophilus* attacks maltose with acid formation, while *Bacillus bulgaricus* has no action on this sugar. The most important mark of difference is that relating to intestinal implantation. *Bacillus bulgaricus* is unable to live and multiply in the intestine of the white rat and of man, whereas *Bacillus acidophilus* undergoes rapid development when administered by mouth, or as the result of milk, lactose or dextrin feeding.

3. The therapeutic value of the various lactic acid ferment preparations is discussed in New and Nonofficial Remedies, 1923, p. 161, "Lactic Acid-Producing Organisms and Preparations." While recent publications contain evidence in favor of *Bacillus acidophilus* therapy, W. H. Morriss (THE JOURNAL, July 14, 1923, p. 93) expresses the belief that whatever improvements occurred in the cases reported by him was due to some other factor than the actual transformation of the common intestinal bacteria into the acidophilus type of organism.

4. The only *Bacillus acidophilus* preparation which, so far, has been accepted by the Council on Pharmacy and Chemistry is Bacillus Acidophilus Milk-Lederle (THE JOURNAL, Feb. 3, 1923, p. 323).

NO INCOME TAX DEDUCTION FOR VACATION

To the Editor:—A physician, tired out by the year's work, takes a two weeks' vacation in order the better to equip himself physically and mentally for the next year's work. During that time he makes, or rather nature makes for him, repairs and replacements just as repairs and replacements are made on his automobile during the year. How may the expense of this vacation be listed as a deduction in preparing one's income tax return? Also may the estimated loss of income due to absence on vacation be listed in any way as a loss in income tax return? If an employer who pays an employee his full salary or part of his salary while the employee is on his vacation is permitted to deduct such expense in figuring net income, it would seem only fair to allow a physician to make a deduction of some sort for his vacation. Can you advise how this may be done? Kindly use only initials.

L. B. N., M.D.

ANSWER.—However necessary rest and recreation may be to the human machine, and however much they may contribute to its efficiency, the law looks on them as personal and not as business matters. Expenses incident thereto are therefore looked on as personal expenses and consequently are not deductible. They are supposedly covered by the "exemption" allowed each individual tax payer.

The loss of income due to the physician's absence is taken care of in the physician's statement of the gross income received. In stating his gross income he does not include money that he might have earned had he not been absent from his practice, but only money earned, so that in the end his net income is diminished exactly in proportion to the diminution of his gross income by reason of his absence.

TREATMENT OF SYPHILIS IN CHILDREN

To the Editor:—Kindly outline a method for treatment of syphilis in a 5 year old child; also in the case of a 1 year old nursing baby.

M.D.

ANSWER.—Syphilis must, of course, be treated with due regard for the complications and unusual symptomatology in the individual case. Without reference to the necessary individualization, the following may be regarded as a possible guide to routine treatment:

A. *Treatment of Syphilis in a Five Year Old Child.*—1. From six to eight injections of arsphenamin (0.3 gm.) or neoarsphenamin (0.4 gm., starting with a half dose) are given at intervals of one week.

2. These are followed by mercury, as diluted mercurial ointment, 2 gram inunctions, six days a week for from six to eight weeks, or 0.02 gm. of mercuric salicylate in oil, injected intramuscularly once a week for eight or ten injections. The urine should be watched for albumin and the gums for stomatitis.

3. Potassium iodid, from 0.3 gm. daily, increased if tolerated to from 2 to 2.6 gm. may be given with the arsphenamin and mercury courses if tertiary lesions are present.

4. Three or four weeks after the mercury course, a Wassermann test should be made, and the foregoing course repeated whether the Wassermann reaction is positive or negative. Further treatment must be individualized.

B. *Treatment of Syphilis in a One Year Old Nursing Baby.*—1. From six to eight injections of neo-arsphenamin (up to 0.15 gm. a dose) intravenously or intramuscularly should be given at intervals of one week.

2. This is followed by mercury as inunction, 0.65 gm., or 0.013 gm. of mercuric salicylate intramuscularly, or yellow mercurous iodid, 0.006 gm., three times a day by mouth for six or eight weeks.

3. After a three week period without treatment, a Wassermann test should be made and the course repeated even though the Wassermann reaction is negative.

4. Treatment should be continued at least two years, actively if the Wassermann reaction remains positive, and at least one course after the Wassermann reaction is negative. Later the periods without treatment can be lengthened, and the treatment must be individualized.

PENALTIES OF NARCOTIC LAW

To the Editor:—Has any one in the narcotic department the power to compromise with one who is guilty of furnishing opiates for addicts and not keeping a record of what was furnished them, and this practice continuing for several years? I am sorry for any one who gets into trouble; but I am strong for enforcement of law, as the only way to get a bad law repealed is to enforce it strictly. Please publish the penalties for violating the narcotic law.

M.D., Ill.

ANSWER.—The Harrison Narcotic Act, Section 7, expressly provides that Section 3929 of the Revised Statutes shall be applicable with respect to the special taxes imposed by the act; and Section 3229 of the Revised Statutes provides:

The Commissioner of Internal Revenue, with the advice and consent of the Secretary of the Treasury, may compromise any civil or criminal case arising under the internal revenue laws instead of commencing suit thereon; and, with the advice and consent of the said Secretary and the recommendation of the Attorney-General, he may compromise any such case after a suit thereon has been commenced.

The penalty clause of the Harrison Narcotic Act reads as follows:

SECTION 9.—That any person who violates or fails to comply with any of the requirements of this Act shall, on conviction, be fined not more than $2,000 or be imprisoned not more than five years, or both, in the discretion of the court.

TAPEWORM

To the Editor:—What is the best method of removing a tapeworm? I have a case at present, and should like to know the latest opinion on the subject.

T. D. SMITH, M.D., Neenah, Wis.

ANSWER.—Oleoresin of aspidium or pelletierin tannate are the remedies of choice, aspidium being more commonly used. To give the remedy the best chance for action, the intestinal contents should be reduced as much as possible by a diet restricted to liquids, chiefly beef tea, for a day or two, and by evacuation, e. g., by means of calomel, castor oil, and colonic flushing. On the morning of the treatment, the patient should stay in bed and be given from 6 to 8 gm. of the oleoresin of aspidium divided into as many capsules, in the course of ten or fifteen minutes. Two hours after the last dose of aspidium, a saline cathartic, such as solution of magnesium citrate, is administered and repeated every two hours until thorough evacuation has been secured.

DREYER TUBERCULOSIS VACCINE

To the Editor:—Please state whether the Dreyer tuberculosis vaccine is yet on the market, where it may be procured, and any other information you may have.

E. A. STEVENS, M.D., Mayfield, Ky.

ANSWER.—The Dreyer tuberculosis vaccine is as yet in the experimental stage. It is being studied in laboratories in England under the authority of the British Medical Research Council. See editorial, THE JOURNAL, July 14, 1923, p. 138.

Medical Education, Registration and Hospital Service

COMING EXAMINATIONS

ALASKA: Juneau, September 4. Sec., Dr. Harry C. De Vighne, Juneau.

MASSACHUSETTS: Boston, September 11-13. Sec., Dr. Charles E. Prior, Room 144, State House, Boston.

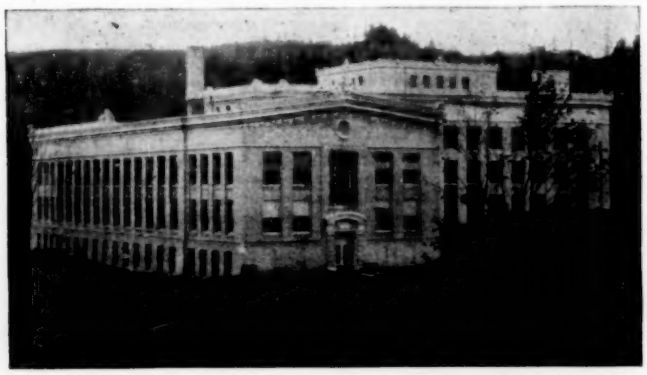
NEW HAMPSHIRE: Concord, September 13-14. Sec., Dr. Charles Duncan, Concord.

THE UNIVERSITY OF OREGON MEDICAL SCHOOL BUILDING

Architects' Description

ELLIS F. LAWRENCE AND WILLIAM G. HOLFORD
PORTLAND, ORE.

The building is a reinforced concrete frame, faced with gray brick trimmed with glazed terra cotta and with a composition roof, curtain walls and partitions of tile. The floors are finished with cement with a cement base. The walls and ceilings are plastered with a hard wall plaster putty coat finish. The ceilings and walls are painted with flat wall paint: the walls a light warm gray, the ceilings almost white, both colors studied to give a maximum of light value, without producing eyestrain from reflected light.



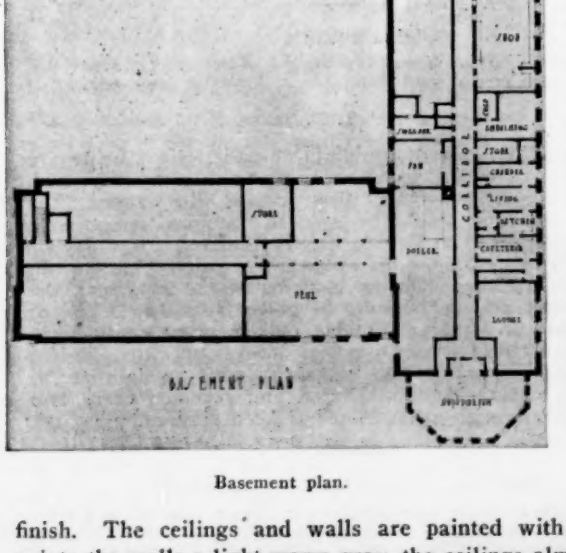
University of Oregon Medical School: at left, original wing, completed in 1918; at right, Mackenzie Hall.

Mackenzie Hall, just completed.

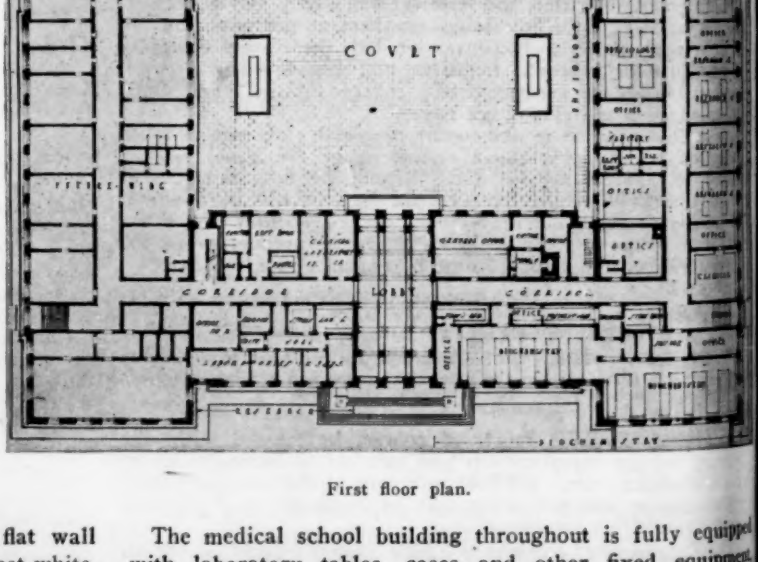
The heating and ventilating installation is a low pressure oil burning steam plant in two units, with a small, high pressure boiler supplying steam to sterilizers, steam tables, etc. The offices, corridors, small research rooms and storage rooms are heated by direct steam. Thermostatically controlled electric heaters are also provided in certain research rooms to furnish heat when the steam plant is not fired. The class rooms are heated by a blast system with a supply fan in the basement and an exhaust fan on the roof. The fume hoods are exhausted by separate exhaust fans, one fan for each laboratory. These fans are controlled from the laboratories.

The lighting is from an overhead enclosed diffusing type of fixture, hung close to the ceiling except in the library, dissecting rooms and biochemistry laboratory. In the pathology and anatomy laboratories, lights are provided under glass covers flush with the table tops, for use in microscopic work.

An ammonia refrigerator plant, to be located in the basement, will serve the cold room in the bacteriologic laboratory and furnish ice for refrigerators in the women's lunch room, for biochemistry, and for all other purposes for which ice may be needed.

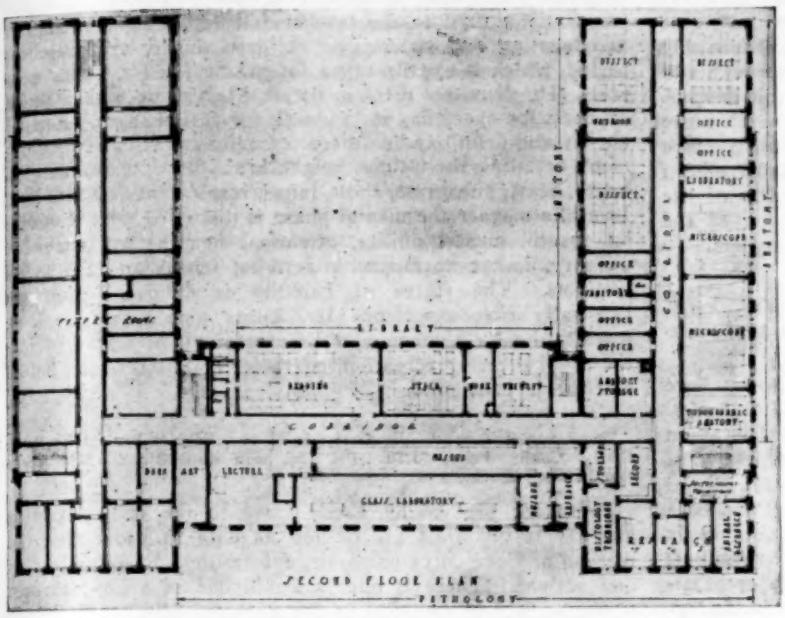


Basement plan.

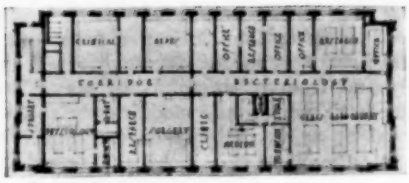


First floor plan.

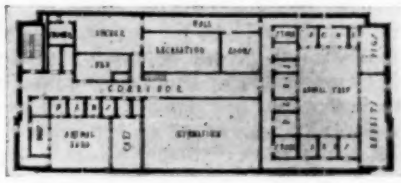
The medical school building throughout is fully equipped with laboratory tables, cases and other fixed equipment, including built-in incubators, all of which were planned after careful study of the most successful equipment in other schools, and with such improvements as use may have suggested.



Second floor plan.



Third floor plan.



Fourth floor plan.

Colorado April Examination

Dr. David A. Strickler, secretary, Colorado State Board of Medical Examiners, reports the written examination held at Denver, April 3, 1923. The examination covered 8 subjects and included 80 questions. An average of 75 per cent. was required to pass. Of the 9 candidates who took the physicians' and surgeons' examination, 4, including 2 osteopaths passed, and 5, including 1 chiropractor, failed. Thirteen candidates were licensed by reciprocity. The following colleges were represented:

College	Year Grad.	Per Cent.
PASSED		
American Medical College	(1911)	84.1
Kansas City University of Physicians and Surgeons	(1922)	78.2
Osteopaths	75,	77
FAILED		
Pacific Medical College	(1917)*	33
University Medical College of Kansas City, Mo.	(1907)	62.4
St. Louis College of Physicians and Surgeons	(1922)	58.5
University of West Tennessee	(1918)	62.4
Chiropractor		4.0

College	Year Grad.	Reciprocity with
LICENSED BY RECIPROCITY		
Loyola University	(1919)	Illinois
Northwestern University Medical School	(1922)	Illinois
George Washington University	(1917)	California
University of Maryland	(1907)	Maryland
University Med. Coll. of Kansas City, Mo. (1913) Missouri	(1904)	Kansas
Omaha Medical College	(1899)	Illinois
Creighton University	(1922)	Nebraska
University of Pennsylvania	(1917)	Minnesota
University of Nashville Medical Department	(1911)	New Mexico
University of Texas	(1920)	Texas
McGill University	(1901)	Canada
University of Zurich, Switzerland	(1917)	Dist. Colum.

* Graduation not verified.

Oklahoma April Meeting

Dr. J. M. Byrum, secretary, Oklahoma State Board of Medical Examiners, reports that 13 candidates were licensed by reciprocity and 3 candidates received duplicate licenses, at the meeting held at Oklahoma City, April 10-11, 1923. The following colleges were represented:

College	Year Grad.	Reciprocity with
LICENSED BY RECIPROCITY		
Indiana University School of Medicine	(1917)	Indiana
Atlanta Medical College	(1916)	Georgia
Baltimore Medical College	(1908)	Maine
College of Physicians and Surgeons, Baltimore	(1905)	W. Virginia
Tufts College Medical School	(1921)	Kansas
Missouri Medical College	(1880)	Missouri
St. Louis College of Physicians and Surgeons (1919) Nebraska	(1910)	Iowa
Meharry Medical College	(1922)	Tennessee
University of Pittsburgh	(1891)	Nebraska
University of Tennessee	(1915)	Arkansas
Vanderbilt University	(1915)	Texas
Baylor University	(1921)	Texas

Book Notices

CEREBROSPINAL FLUID IN HEALTH AND IN DISEASE. By Abraham Levinson, B.S., M.D., Associate in Pediatrics, Northwestern University Medical School. With a foreword by Ludvig Hektoen, M.D. Second edition. Cloth. Price, $5. Pp. 267, with 69 illustrations. St. Louis: C. V. Mosby Company, 1923.

Examination of the cerebrospinal fluid has gradually come to take a more and more important position in the diagnosis of disease, and subarachnoid medication has now a definite field of its own. In this book, which has been brought fully up to date in this edition, the facts concerning the origin, function, composition and pathology of the fluid are presented in simple language and attractive form. After a description of the fluid in general terms, the changes to be found in different diseases are given under the titles of the diseases, the list of which is a good index of the importance of the subject. The operative technic for securing samples, and the details of the important methods of examination are both well given and admirably illustrated. The book fills a very definite need and can be heartily recommended both to the student and to the practitioner.

REPORTS OF THE COMMITTEE FOR THE INVESTIGATION OF THE CAUSES OF DENTAL DISEASE. I. The Structure of Teeth in Relation to Dental Disease. By J. Howard Mummery. Medical Research Council, Special Report Series, No. 70. Paper. Price, 2 shillings, net. Pp. 24, with 18 illustrations. London: His Majesty's Stationery Office, 1922.

This consists of three chapters summarizing largely previous investigations concerning: variations in the composition and structure of the enamel and the relationship of these variations to caries; the production of artificial caries (historical), and arrested caries of the teeth. The author concludes that it does not seem possible that enamel is entirely inorganic, but that the penetrability of the enamel (to stains and other substances in solution) appears to be of importance in the study of caries. The question of the further consolidation of the enamel by the deposit of calcific material after the eruption of the human tooth, in his opinion, requires further investigation. The second chapter reviews the efforts to produce artificial decay, from the experiments of Magitot to and including those of Miller, and contrasts the difference between artificial caries and that in the mouth of a living person. Arrested caries is due, the author states, to mechanical causes and vital reaction in combination. The translucent region in the dentin is an exhibition of this vital reaction not usually capable by itself of preventing the final destruction; but, when assisted by mechanical agents (cleans-

ing, etc.) and possibly aided by the alterations accompanying pigmentation of the outer zone of the dentin, it is quite able to prevent further encroachment of the disease. Presumably this is only the first and preliminary report of a thorough and needed investigation into the problems of dental disease. Certainly the phase of arrested caries deserves much more study and from other points of view than that of structure of the teeth, which may modify such conclusions as have been arrived at as to the importance of the penetrability of the enamel, the part played by the translucent regions of the dentin, and the effect of the so-called mechanical agents.

Ophthalmoscopy, Retinoscopy and Refraction. By W. A. Fisher, M.D., F.A.C.S., Professor of Ophthalmology, Chicago Eye, Ear, Nose and Throat College. Cloth. Price, $2.50. Pp. 218, with 248 illustrations. Chicago: The Author, 1922.

In this small volume, the author has endeavored to lay bare the mysteries of the ophthalmic profession in terms of A B C so that any student or general practitioner may qualify as an ophthalmologist. Such minor details as a careful study of physiologic optics, gross and microscopic anatomy of the eyeball and adnexa, pathologic anatomy, physiology and bacteriology of the eye apparently do not matter; all that is necessary is a Loring ophthalmoscope and the schematic eye, this book, and any one can diagnose and treat any opththalmic condition. This general attitude, and the infrakindergarten style in which the book is written, constitute a reversion to the days when the ophthalmologist was a specialist of title and not of technical training and intensively specialized knowledge. The diction of the book varies between the multipediculate sentences of the Helmholtz type and the ultra-abbreviated sentences affected by Victor Hugo. Pasted to the rear page is an extension on which there have been printed sixteen colored plates, representing different conditions of the fundus. These are well labeled and instructive.

Der Gesichtsausdruck und seine Bahnen beim Gesunden und Kranken besonders beim Geisteskranken. Von Prof. Dr. Theodor Kirchhoff. Boards. Price, $1.80. Pp. 227, with 68 illustrations. Berlin: Julius Springer, 1922.

Since the earliest times, physicians as well as laymen have been accustomed to rely largely on facial expression as an index to character and to health or disease. Whether consciously or not, we are still influenced in diagnosis and prognosis by the looks of the patient, and there is, without doubt, some fundamental ground of support for the custom. In this book, Dr. Kirchhoff, a psychiatrist of note, has endeavored to correlate the observations of many years of practice with anatomic and physiologic facts, with the purpose of rationalizing and systematizing this method of study. He distinguishes between the physiognomy, or static condition, and the play of the features, or the mimetic activity, of the face, and has reviewed in considerable detail literature and art, both ancient and modern, as well as the results of scientific work and theory. The anatomy and physiology of the facial muscles are well presented; consideration of movements of expression leads to extensive discussion of the physiology and anatomy of emotion and the problems of muscle tonus. The latter is considered especially in the light of recent work in physical chemistry and the functions of the connective tissues in relation to osmosis and ionic concentration. Excellent descriptions are given of the facial expression as modified by disease, particularly mental disease, and the illustrations are admirable. The subject is somewhat severely technical and philosophic, but it is of general interest and the book is well worth reading.

The Health of the Runabout Child. The Journey from His Mother's Lap to the School Gate. By William Palmer Lucas, A.B., M.D., LL.D., Professor of Children's Diseases, University of California Medical School. Cloth. Price, $1.75. Pp. 229, with 3 illustrations. New York: The Macmillan Company, 1923.

Dr. Lucas has expressed in a manner intelligible to the layman, and instructive both to the layman and to the medical reader, the management of the child between the period of infancy and the school age. "The journey from mother's lap to the school gate," as he calls it, is likely to be neglected from the standpoint of health and education. The burden is frequently shifted to the teacher later. To awaken interest in educating and supervising children during the preschool period, which is usually taken for granted, is Dr. Lucas' purpose. He discusses diets in detail, illustrating with a series of meals for every day in the week for various ages. Equally clearly and definitely he describes bodily growth and development, detailing the weight, height, brain, head, teeth, muscles, bones, heart, pulse rate, chest, lungs, respiration and abdomen. In a like manner the mental phase is discussed with emphasis on speech, mental ability, attention, imagination, curiosity, memory, imitation, muscular activity, senses and the social instincts. The status of heredity is defined. From an unusually rich experience Dr. Lucas also treats hygiene, teaching health, the common diseases of the preschool period, the usual defects, recreation, character training, wrong habits and the nervous child.

Coué for Children. By Gertrude Mayo. With a Preface by Emile Coué. Cloth. Price, $1.50. Pp. 126, with illustrations. New York: Dodd, Mead & Co., 1923.

From the preface by Emile Coué to the end, sentiment and lay testimonials are offered as data to prove that the method of Coué cures paralysis, deformities, ulcers, abscesses and asthma. There is only a semblance of a bone thrown to the science of medicine in the statement that medical care is not discarded, but that Coué's principles should be applied as after-treatment. In the case reports, however, only suggestion is mentioned for the cure of abscesses, paralysis and tuberculosis. There never appears to be a problem in diagnosis. Slow healing ulcers of the forehead are labeled tuberculous without further ado. Paralysis is cured which was said to be due to pressure of a fractured skull on the brain. The first two chapters of the book are devoted to a description of the so-called children's clinic conducted by Mlle. Kaufmant for Coué. The remaining three chapters are a more or less literary assemblage of experiences and ideas concerning autosuggestion for children.

The Encyclopedia of Food. The Stories of the Foods by Which We Live, How and Where They Grow and Are Marketed, Their Comparative Values and How Best to Use and Enjoy Them. Cloth. Price, $10. Pp. 596, with many illustrations. New York: Artemas Ward, 1923.

This is a one volume encyclopedia of food substances eaten by human beings. It is addressed primarily to the individual consumer. Each substance considered is defined, synonyms are given, the method of preparation and use as food is fully described, and in most instances there are excellent illustrations of various species and the manner of growth. A reference to certain common food substances, about which a great deal of wrong information has been given with a view to encouraging overuse, indicates that the author is not apparently interested in advancing the interests of any particular food substance. In other words, he has prepared a reference work, not a propaganda. The book is interesting, well written, and beautifully printed.

Exploration clinique et diagnostic chirurgical. Par Félix Lejars, Professeur de Clinique chirurgicale a la Faculté de médecine de Paris. Cloth. Price, 60 francs. Pp. 778, with 907 illustrations. Paris: Masson et Cie, 1923.

This is an exposition of surgical physical examination and an atlas of surgical diagnosis. It presents the subject of regional surgical diagnosis in a practical manner, and is designed particularly for medical students and general practitioners. It aims especially to instruct in special methods of palpation in various pathologic conditions in the various regions of the body. It is essentially a treatise on technic and a guide in arriving at a diagnosis when a patient is seen for the first time. The author contemplated producing such a work more than twenty years ago, and the book is the result of much thought and presents a magnificent atlas of surgical pathology collected from the author's personal experience. He is particularly interested in presenting various methods of palpation which he has developed during his long career. The book presents in detail the various maneuvers

that he has found useful in examining special organs and special regions. He emphasizes the value of inspection, combined with intelligent manual examination. The various maneuvers are illustrated by a large and excellent collection of carefully taken photographs of patients presenting the conditions discussed. These photographs are of inestimable value, and present an entirely new method of surgical teaching in book form. The book is otherwise comparable to the work on surgical diagnosis by de Quervain, but has the added value of showing in great detail the exact manner of carrying out the physical examination. The book is excellently printed on good paper, and the illustrations are well reproduced.

ESSENTIALS OF SURGERY. A Textbook of Surgery for Students and Graduate Nurses and for Those Interested in the Care of the Sick. By Archibald Leete McDonald, M.D., Johns Hopkins University. Second edition. Cloth. Price, $2.50 net. Pp. 293, with 49 illustrations. Philadelphia: J. B. Lippincott Company, 1923.

This textbook on essentials of surgery is prepared for the instruction of nurses in training. General principles as applied to surgery are first considered by taking up bacteriology, infections, tumors, wounds, bones, joints and the vascular, lymphatic and nervous systems. The remaining half of the book is devoted to a consideration of surgical conditions and pathologic changes occurring in the various regions of the body. General principles of treatment are outlined, but operative and nursing technic are avoided. The book is carefully written, is not too long, and explains surgical conditions in a simple manner.

DIE KRANKHEITEN DES VERDAUUNGSKANALS (OESOPHAGUS, MAGEN, DARM). Ein Leitfaden für praktische Aerzte. Von Dr. Paul Cohnheim, Spezialarzt für Magen- und Darmkrankheiten in Berlin. Fourth edition. Paper. Price, 4 marks, 80 pfennigs. Pp. 281. Berlin: S. Karger, 1923.

To the practicing physician who reads German, this little book can be heartily recommended as a means of improving his grasp on the diagnostic essentials and the practical therapeutic details of gastro-enterology. The subject is treated here and there in perhaps a somewhat too schematic and dogmatic manner, but this is actually of advantage in a work intended as a practical guide.

DER FUNKTIONELLE BAU DES MENSCHLICHEN HERZENS. Von Dr. Walter Koch, Privatdozent an der Universität Berlin. Paper. Price, 1620 marks. Pp. 146, with 61 illustrations. Berlin: Urban & Schwarzenberg, 1922.

This work is chiefly concerned with the musculature and the conduction system of the heart. It is not alone a compilation, for it embodies the results of much original, careful investigation. While these results are largely confirmatory of those arrived at by others, the volume will serve a useful purpose as a reference book that contains much information helpful to the anatomist, physiologist and clinician. The subject is well presented, and there are many excellent illustrations.

L'ANNÉE THÉRAPEUTIQUE. Médications et Procédés Nouveaux. Par le Dr. L. Cheinisse. Troisième Année, 1922. Paper. Price, 7 francs net. Pp. 208. Paris: Masson et Cie, 1923.

The third annual volume (in French) by Cheinisse on therapeutic progress during the year 1922 should be welcome to all who appreciate the scholarliness, command of literature, and practical tendencies of this author. His aim is to render available to the general practitioner the therapeutic technic of the latest methods of treatment. Though he aims to cover "foreign" as well as French literature, he has not taken cognizance of some new American and German products.

PRACTICAL ANAESTHETICS FOR THE STUDENT AND GENERAL PRACTITIONER. By Charles F. Hadfield, M.B.E., M.A., M.D., Hon. Anaesthetist, Prince of Wales's Hospital. Cloth. Price, $3. Pp. 244, with 32 illustrations. New York: William Wood & Co., 1923.

This book briefly covers the practical features of anesthesia and anesthetics, and is designed as an elementary handbook for medical and dental students. Problems of purely theoretical interest and, with the exception of chloroform, the physiologic actions of the various anesthetic agents, are not discussed. The methods of administration selected for detailed description are those found to be the most satisfactory in the author's experiences. American anesthetists, accustomed to electrically driven vaporizing machines, would not be content to use the hand bellows Junker inhaler, which is recommended. Considerable space is devoted to the administration of nitrous oxid for dental extractions and manipulations. With the exception of spinal anesthesia, local and regional anesthesia are entirely omitted. The author very pertinently states that "the best treatment of anesthetic accidents is to anticipate them, and adopt measures to prevent their occurrence."

Miscellany

THE NEW TREATMENT FOR TUBERCULOSIS

The reports in the public press of the new "antigen" treatment of tuberculosis, although authoritatively based, have, we think, the stamp of being at least premature. The extraordinary propensity, now being demonstrated, to rush into lay newspaper print the announcement of a therapeutic laboratory result, long before whatever clinical value it may have has been confirmed, is certainly against the public interest. A conspicuous example of this has been in the case of Professor Dreyer. The true scientist shrinks from and abhors publicity of the kind, and in this instance he had probably nothing to do with the "booming." Meanwhile, the question is being asked, How was it that a scientific lecture, of a distinctly technical character delivered at a metropolitan hospital, should have attracted lay notice, and led to prominent reports on the morning following in the press? Again, the reports were exceedingly accurate and, from their technical details, far beyond the capacity of the average reporter to have compiled. However, we need not pursue the matter further, save to repeat that such premature announcements are against the public interests. The general effect is to inspire an undue confidence in sufferers in need of help, and to raise hopes which may never be realized. If the new "antigen" treatment should fail to justify the expectations, so widely advertised, for the treatment of tuberculosis, science will have dealt a cruel blow of disappointment to all those afflicted with the disease. Meanwhile, it may be asked, if this new treatment should be entirely successful, what will become of the £30,000 offered by the Red Cross Society to M. Spahlinger, to enable his researches to be continued?—*Medical Press and Circular* **115**:518 (June 27) 1923.

ENLIGHTENING THE PUBLIC

Only too often, when a physician of today tries to explain to his patient what is the matter with him, he finds it impossible to get the explanation into terms within the patient's understanding. The latter, if he is intelligent enough, will face the fact of his lack of training without rancor, and content himself with whatever parts of the exposition he can grasp. But that sort of intelligence, unluckily, is rather rare in the world; it is confined, indeed, to men of the sort who are said to have the scientific mind, i. e., a very small minority of men. The average man, finding himself getting beyond his depth, instantly concludes that what lies beyond is simply nonsense.

It is this fact which accounts for the great current prosperity of such quackeries as osteopathy, Christian science, Couéism and so on. The agents of such quackeries gain their converts by the simple process of reducing the inordinately complex to the absurdly simple. Unless a man is already equipped with a considerable knowledge of chemistry, bacteriology and physiology, no one can ever hope to make him understand what is meant by the term anaphylaxis, but any man, if only he be idiot enough, can grasp the whole theory of Couéism in twenty minutes. The fact that such imbecilities prosper increasingly in the world, and gain adherents in constantly superior circles—that is, among persons of more and more apparent education and culture—is no more than proof that the physical sciences are becoming increasingly recondite and difficult, and that the relative number of persons congenitally incapable of comprehending them is growing year by year.—H. C. Mencken, Baltimore *Sun*.

Medicolegal

Evidence in Fracture Case—As to Proper Treatment

(Foreman v. Surber (Kan.), 213 Pac. R. 667)

The Supreme Court of Kansas, in affirming a judgment in favor of the plaintiff, without stating the amount of the judgment, says that it was recovered for alleged negligence in treating the plaintiff's broken arm. The humerus of his left arm was broken, and the defendant set the arm. There was evidence which tended to show about two days after the arm was set, the plaintiff felt the parts of the broken bone grating on each other; that he reported that fact to the defendant; that the defendant, after a cursory examination of the arm, stated that it was all right, was straight, the parts of the bone were in apposition to each other, and were not moving—that the trouble was in the plaintiff's head and not his arm; that the plaintiff continued to feel the bone grating for a number of days and continued to report to the defendant, who continued to state that the bone was all right and that the trouble was in the plaintiff's head; that, when the splints and bandages were removed, the arm was crooked; that the plaintiff wanted his arm straightened; that the defendant advised against rebreaking and resetting the arm; that the arm was again broken and the bone reset, but the parts never united again; and that the arm was useless. A physician and surgeon described what would have been proper treatment for the arm and what would have been proper examinations of it after the plaintiff's complaints. The defendant demurred to the evidence. It was not error to overrule his demurrer. The evidence compelled the submission of the case to the jury.

Complaint was made by the defendant of hypothetic questions asked of the physician and surgeon who testified in behalf of the plaintiff. The questions were not asked to show that the treatment used was improper, but were asked to show what would have been proper treatment. The evidence tended to show that physicians disagree concerning their treatment of broken bones, and that the same physician will not always act in the same way, but is governed largely by the conditions that exist in each case. The evidence objected to was consistent with those differences. No reason is apparent why a physician and surgeon should be permitted to testify in response to hypothetic questions concerning what would be improper treatment and not be permitted to testify concerning what would be proper treatment. Wherefore the court holds that a physician and surgeon may testify as an expert concerning what would be the proper treatment of a broken bone.

Power to Prohibit Sale of Intoxicating Liquors for Medicinal Purposes

(Ex parte Hixson (Calif.), 214 Pac. R. 677)

The District Court of Appeal of California, Second District, Division 2, in discharging a writ of habeas corpus and remanding the petitioner into the custody from which he had sought to be released, says that he was a licensed pharmacist in Los Angeles, who had been convicted of filling a physician's prescription that called for more than 8 ounces of alcoholic liquor, in violation of a city ordinance which was adopted prior to the ratification of the Eighteenth Amendment. His principal contention was that while a state or a political subdivision thereof, in the exercise of its police power, may regulate the sale of alcoholic liquors for medicinal uses, it cannot prohibit their sale for such uses. Then he contended that the practical effect of the combined operation of the ordinance, which made it an offense for a pharmacist to fill any single prescription calling for more than 8 ounces, and of the Volstead Act, which he interpreted as not allowing a physician to issue more than one prescription for the same person in any ten-day period, was to make it unlawful for a licensed pharmacist to sell to any one person, on a physician's prescription, more than 8 ounces of alcoholic liquor in any period of ten days, which amount, it was contended, was so small as to be valueless for medicinal purposes. Assuming, without conceding, that such was the result of the operation of the city ordinance and the national law, the court does not think that the ordinance had been rendered unreasonable. More than that, the court thinks that the ordinance would not have been unreasonable and void if it had entirely prohibited the sale of alcoholic liquor as a medicine.

That the state or any political subdivision thereof, vested with local police power, may prohibit all traffic in intoxicating liquors for beverage purposes is no longer a debatable proposition. Not only may the sale of intoxicants as beverages be prohibited, but it also is well established that a state, or any of its political subdivisions invested with local police power, may adopt such measures having a real or substantial relation to the suppression of traffic in intoxicating beverages as it may deem necessary for that purpose in order to make its action effective. And though alcoholic liquor, when used for certain purposes, may be beneficial and useful, still its sale for such beneficial and useful purposes may be prohibited if it can be seen that prohibitory measures of that nature have a real and substantial relation to the suppression of all traffic in intoxicants for beverage purposes.

If wine, whisky, brandy and the like are useful for medicinal and other nonbeverage purposes, still the evils which flow from their use as a beverage so greatly menace the health, peace, morals and safety of society that the law-making branch of the government may with reason regard those evils as overwhelmingly outweighing the good services which such liquors may perform as medicines. If experience shows that the sale of intoxicating liquors for medicinal purposes opens the door to that train of evils which admittedly follows on their general use as beverages, then why may not their use as medicines be absolutely prohibited? That the sale of such liquors for medicinal purposes does greatly facilitate the evasion of the whole scheme of prohibitory legislation is a matter of common notoriety. A city's entire scheme of prohibition might fail if pharmacists were to be permitted to sell alcoholic liquors for medicinal use. And because this is so, the city of Los Angeles, had it deemed it wise and expedient, could have forbidden the sale of such liquors as medicines, even though such sales, regarded as separate transactions, might be entirely innocuous.

Though no case directly in a number of decisions was called to the court's attention, the principles announced in a number of decisions are determinative.

Nor does the court think that there was any merit in the contention that the subdivision of this ordinance relating to the filling of prescriptions by pharmacists discriminated unlawfully between the filling of prescriptions for alcoholic liquors and the filling of prescriptions for drugs or other curative agencies. Even if the sale of drugs, poisons and narcotics had not been similarly regulated, the ordinance did not arbitrarily discriminate between the sales of such articles and the sale of alcoholic liquors as medicines.

Society Proceedings

COMING MEETINGS

American Association of Obstetricians, Gynecologists, and Abdominal Surgeons, Philadelphia, Sept. 19-21. Dr. James E. Davis, 111 Josephine Avenue, Detroit, Secretary.

American Roentgen Ray Society, Chicago, Sept. 18-23. Dr. W. W. Watkins, Goodrich Building, Phoenix, Ariz., Secretary.

Association of Military Surgeons of the United States, Carlisle Barracks, Pa., Oct. 4-6. Col. James Robb Church, Army Medical Museum, Washington, D. C., Secretary.

Colorado State Medical Society, Glenwood Springs, Sept. 4-6. Dr. F. B. Stephenson, Metropolitan Building, Denver, Secretary.

Indiana State Medical Association, Terre Haute, Sept. 26-28. Dr. Charles N. Combs, Terre Haute, Secretary.

Kentucky State Medical Association, Crab Orchard, Sept. 17-20. Dr. A. T. McCormack, 532 West Main Street, Louisville, Secretary.

Michigan State Medical Society, Grand Rapids, Sept. 11-13. Dr. F. C. Warnshuis, 410 Powers Building, Grand Rapids, Secretary.

Missouri Valley, Medical Society of the, Omaha, Sept. 20-21. Dr. Charles W. Fassett, 115 East 31st Street, Kansas City, Secretary.

Pennsylvania, Medical Society of the State of, Pittsburgh, Oct. 1-4. Dr. W. F. Donaldson, Jenkins Arcade, Pittsburgh, Secretary.

Wisconsin, State Medical Society of, Milwaukee, Oct. 3-5. Mr. J. G. Crownhart, 558 Jefferson St., Milwaukee, Secretary.

Current Medical Literature

AMERICAN

Titles marked with an asterisk (*) are abstracted below.

American Journal of Diseases of Children, Chicago

25: 413-502 (June) 1923

*Importance of Colostrum to New-Born Infant. A. Kuttner and B. Ratner, New York.—p. 413.
Case of Cerebral Cyst in an Infant. H. G. Jacobi, New York.—p. 435.
*Malignant Hypernephroma in Children. L. A. Hoag, Ann Arbor.—p. 441.
*Studies of Tetany. J. L. Gamble, Boston; G. S. Ross, Montreal, and F. F. Tisdall, Toronto.
I. Effect of Calcium Chlorid Ingestion on Acid-Base Metabolism of Infants.—p. 455.
II. Effect of Ingestion of Hydrochloric Acid Producing Substances and Probable Manner of Action in Treatment.—p. 470.
Effect of Spray Process of Drying on Vitamin C Content of Milk. G. W. Cavanaugh, R. A. Dutcher and J. S. Hall, Ithaca, N. Y.—p. 498.

Importance of Colostrum to the New-Born.—Careful clinical study made by Kuttner and Ratner of eighteen cases in which there was no possibility of error concerning the ingestion of colostrum revealed no evidence of harm to the infant due to the omission of colostrum. These investigations indicate that colostrum feeding in human beings has no significance whatever comparable to that revealed by the work of Theobald Smith and his co-workers in the feeding of the new-born calf.

Malignant Hypernephroma in Child.—In Hoag's case the presumptive evidence of an abdominal tumor in a girl, aged 4 years and 3 months, showing heterosexual precocity, as evidenced by hypertrophied clitoris, deep voice, and hypertrichosis of distribution characteristic of the male, and brought to the hospital because of convulsions alternating with lethargy, suggested the diagnosis of hypernephroma, with a possibility of intracranial metastasis. A pneumoperitoneal examination revealed a tumor in the region of the right suprarenal. A large tumor was found behind the peritoneum covering the upper pole of the downwardly displaced right kidney, and extending upward to the junction of the hepatic veins with the inferior vena cava. Complete removal was impossible because of the extent of the mass and the patient's poor condition. In spite of blood transfusion she died, four hours after the operation. Microscopic examination confirmed the clinical diagnosis of malignant hypernephroma of the right suprarenal cortex.

Treatment of Tetany.—Gamble and Ross assert that there is theoretic ground for regarding calcium chlorid and hydrochloric acid as more efficient agents than ammonium chlorid in the treatment of tetany.

American Journal of Medical Sciences, Philadelphia

165: 625-780 (May) 1923

*Tetany in Adult; Alkalosis and Calcium Metabolism. W. Tileston and F. P. Underhill, New Haven, Conn.—p. 625.
*Differential Study of Case of Pulmonary Stenosis of Inflammatory Origin (Ventricular Septum Closed) and Two Cases of Pulmonary Stenosis and Pulmonary Atresia of Developmental Origin with Associated Ventricular Septal Defect and Death from Paradoxical Cerebral Embolism. M. E. Abbott, D. S. Lewis and W. W. Beattie, Montreal.—p. 636.
*Heart Block. P. D. White and L. E. Viko, Boston.—p. 659.
*Blood Pressure Reactions to Passive Postural Changes Index to Myocardial Efficiency. M. A. Mortensen, Battle Creek, Mich.—p. 667.
Laws of Heredity and Application to Conditions in Man. J. A. Buchanan, Rochester, Minn.—p. 675.
Tolysin in Acute Rheumatic Fever and Other Conditions. H. G. Barbour, E. Lozinsky and C. Clements, Montreal.—p. 708.
Early Symptoms and Diagnosis of Tumors of Spinal Cord; Surgical Treatment. C. A. Elsberg, New York.—p. 719.
*Laryngeal Paralysis Associated with Jugular Foramen Syndrome and Other Syndromes. G. B. New, Rochester, Minn.—p. 727.
Pathology of Nodular (Adenomatous?) Goiters in Patients With and Those Without Symptoms of Hyperthyroidism. L. B. Wilson, Rochester, Minn.—p. 738.
*Clinical Criteria of Activity in Pulmonary Tuberculosis. P. H. Ringer, Asheville, N. C.—p. 742.

Sodium and Calcium Blood Content in Tetany.—Three cases of tetany, all of the secondary form, are reported by Tileston and Underhill. In these cases, the sodium bicarbonate content of the blood was abnormally high. This is easily explained in the first case by the administration of large amounts of sodium. In the second and third cases it is not clear why the bicarbonate was increased. A low serum calcium was found in one case, another showed a normal figure during a period of latent tetany. A study of the calcium metabolism in one case revealed definite abnormalities. Large amounts of indican were found in the urine in one case.

Pulmonary Stenosis and Atresia.—Abbott, Lewis and Beattie, summarize their observations on these cases as follows: Pulmonary stenosis or atresia with closed interventricular septum is of unusual occurrence and is due to a fetal endocarditis setting in after the heart has formed. Narrowing of the pulmonary tract with associated ventricular septal defect is the much more frequent finding and is due to arrested development in early embryonic life and is usually associated with a deviation to the right of the aorta. In pulmonary atresia the degree of cyanosis is naturally more intense and the duration of life shorter than in pulmonary stenosis. In atresia, however, an associated septal defect facilitates aeration of the blood especially with a deviation to the right of the aorta; such cases have, therefore, a better prognosis and present a more moderate degree of cyanosis than does pulmonary atresia with closed interventricular septum. In pulmonary stenosis, on the other hand, an associated septal defect is unfavorable, for it tends both to reduce the volume of blood passing through the stenosed orifice and to permit the passage of venous blood into the arterial stream. The most favorable prognosis, therefore, in pulmonary stenosis, is in cases in which the ventricular septum is closed. Dyspneic attacks are especially frequent and severe in cases in which a marked ischemia of the pulmonary circulation is present, as in pulmonary stenosis with pinhead orifice and closed septum and in certain cases of patent ductus arteriosus. Cerebral complications of the nature of abscess or infarction are a frequent complication of congenital cardiac cases presenting defects in the interauricular or ventricular septum, and are in the great majority of cases embolic in origin, from a focus in the venous system (paradoxical or crossed embolism). Two cases of this interesting finding are here added to the literature.

Intraventricular and Auriculoventricular Block.—White and Viko assert that, intraventricular block is almost as frequently seen in a large medical clinic as in auriculoventricular block, 4 per cent. of the former class having been found in 3,219 cases observed at the Massachusetts General Hospital, as compared with 4.8 per cent. of the latter type. Complete auriculoventricular block showed one-fifth the frequency of unquestionable partial auriculoventricular block. Bundle branch block of high grade made up slightly less than one third of the total number of cases of intraventricular block. Sino-auricular block was rarely found, less than half as often as complete auriculoventricular heart block. Arteriosclerosis was apparently responsible for the majority of cases of complete auriculoventricular block and of intraventricular block of all degrees, but especially, of bundle branch type, where it figured as the chief factor in over 80 per cent. Syphilis was a probable factor in sixteen of 156 cases of auriculoventricular block and in eleven of 130 cases of intraventricular block. In the series of partial auriculoventricular block cases digitalis seemed to be chiefly responsible in more than half, on a background of rheumatic heart disease more often than arteriosclerotic heart disease. Digitalis was also largely responsible for six of the eleven cases of "sino-auricular block." Less than one quarter of the cases of complete auriculoventricular block showed heart failure, either anginal or congestive, at the time of discovery, and also less than one quarter gave a history of Stokes-Adams attacks. The mortality from heart failure in the last seven and a half years has been slightly higher in the group with intraventricular block than in the group with auriculoventricular block. Several of the cases with complete heart block were in fairly good condition some years after the discovery of the block, in fact nine being in "good or in fair health" from one to seven years after the first electrocardiographic evidence of complete heart block. Heart failure was found more often in the patients with intraventricular block than in those with auriculoventricular block, especially heart failure of the

anginal type. Angina pectoris was found about four times more often in intraventricular block then in auriculoventricular block. It appears from this study that intraventricular block is of greater significance than auriculoventricular block. For its detection the electrocardiograph is essential.

Drop in Systolic Pressure Evidence of Myocardial Inefficiency.—A drop or more than 8 per cent. in the systolic pressure, in changing from the reclining to the erect posture, is viewed by Mortensen as an evidence of myocardial inefficiency. This test is applicable in cases of angina pectoris or advanced arteriosclerosis in which exercise tests are contraindicated. Cases of angina pectoris uniformly show a decided drop in systolic pressure. The test is uniform for all individuals as it practically eliminates all but the factor of gravity in the circulation. It is easily applied without discomfort to the patient and can be used at intervals for the purpose of noting progress in the management of cases and as an index to the influence of digitalis or exercise on myocardial efficiency.

Laryngeal Paralysis Due to Neoplasm.—A review of the cases recorded in the literature and of his own group of cases, convinces New that laryngeal paralysis associated with a syndrome due to involvement of the last four cranial nerves and the cervical sympathetic nerve in the region of the jugular foramen is quite unusual. When this occurs it is usually due to a neoplasm, although a tuberculous process in the glands of the neck or an acute phlegmon may be the cause.

Estimating Activity of Pulmonary Tuberculosis.—For the man doing general work, Ringer says, the estimation of the presence or absence of activity in tuberculosis will be based, in the main, on the careful consideration of symptoms which alone point out the relative strength of the two great fundamental biologic factors in any infectious disease; virulence of the invading parasite, and resisting powers of the invaded host.

American Journal of Obstetrics and Gynecology, St. Louis

5: 461-580 (May) 1923

*Effects of Irradiation on Fetal Development. H. Bailey and H. J. Bagg, New York.—p. 461.
*Evolution of Operation for Myoma of Uterus: Study Based on Over Two Thousand Laparotomies. D. Von Ott, Petrograd, Russia.—p. 473.
*Routine Treatment for Hyperemesis Gravidarum. E. Speidel, Louisville.—p. 481.
*Dry Labor. J. O. Polak, Brooklyn.—p. 488.
Transplantation of Human Ovaries: Present Status and Future Possibilities. W. S. Bainbridge, New York.—p. 493.
Surgical Treatment of Certain Puerperal Infections. J. F. Baldwin, Columbus, Ohio.—p. 499.
*Gonococcus Arthritis in Pregnancy. G. D. Royston, St. Louis.—p. 512.
Red Degeneration of Fibroids. J. M. Maury, Memphis.—p. 519.
Sarcoma of Uterus, Report of Thirty Cases. M. E. Vogt, Philadelphia.—p. 523.
Case of Hernia of Female Internal Genitalia Through Inguinal Canal. H. W. Hewitt, Detroit.—p. 530.
Female Mammae in Relation with Pelvic Organs. D. Hadden, Oakland, Calif.—p. 536.
Twin Tubal Pregnancy. W. E. Darnall, Atlantic City, N. J.—p. 537.
*Unusual Type of Carcinoma in Woman Twenty-Nine Years of Age. A. Stein, New York.—p. 539.
Case of Paratyphoid Beta Bacillus Infection of Ovarian Cyst. J. A. Corscaden, New York.—p. 545.
Two Cases of Obstetric Sepsis. G. L. Brodhead, New York.—p. 548.
Case of Retinitis Gravidarum with no Other Indications of Toxemia. J. K. Quigley, Rochester, N. Y.—p. 550.

Effect of Roentgen Ray and Radium on Fetal Development.—Experimental and clinical studies relating to the effects of radium and roentgen-ray irradiation on the functional activity of the ovary and the reaction on the developing fetus, when irradiation is given before or during the various stages of pregnancy, are reviewed by Bailey and Bagg. They conclude that it is questionable whether radium or roentgen-ray irradiation should be used to destroy the ripe follicles, leaving the immature ones injured but capable of development. This statement is made entirely on the strength of experimental work on lower animals and we do not feel justified in considering the available clinical records as adding conclusive evidence in this regard. In the treatment of menorrhagia in the child-bearing period, they believe that complete sterility is preferable to the possibility of a damaged germ plasm. Irradiation of the ovum during early pregnancy should never be permitted. Radiation in late pregnancy, while it may not produce gross abnormalities at birth, may hinder the growth and development of the child in later life.

Operation for Myoma of Uterus.—Experience leads Ott to the conviction that, whenever possible, operation for uterine myoma should be performed through the vagina. This guarantees the smallest risk. Hysteromyomectomy is superior in technic to any other abdominal operation, not excluding ovariotomy. Excepting the truly conservative myomectomies, the radical operation should be given preference. Merely palliative measures, such as ligation of vessels, extirpation of the ovaries, etc., must be repudiated. Particularly objectionable is castration, whether obtained by operation or without operation by means of roentgen rays. This method is not only useless, but with the suppression of an important endocrine function, exerts a harmful effect on general endocrine activity and metabolism. Vaginal operations not only minimize the immediate dangers of operation but offer security against some of the sequelae of laparotomy, especially the formation of a hernia. Panhysterectomy is the operation of choice.

Treatment of Vomiting of Pregnancy.—Irrigating the large bowel with a solution containing sodium bicarbonate, rectal feeding, and the administration of sodium bromid and corpus luteum extract, constitutes the treatment advocated by Speidel.

Dry Labor.—Polak urges that each case of dry labor should be considered on its merits; that the determining factors in the selection of a method are the position of the presenting part, the length of the labor and the condition of the cervix; that when infravaginal delivery is possible, cervical dilatation is best handled with morphin and vaginal plugging, and finally, when section is elected, owing to the fact that all dry labors are potentially infected, the classical operation is not that of choice, but one should be selected that excludes the peritoneal infection by peritoneal flaps.

Gonococcus Arthritis in Pregnancy.—Among 4,284 admissions on the obstetric service of two hospitals, four cases of gonococcus arthritis during pregnancy have been found by Royston. In one case there was evidence that the disease was transmitted to the child in utero. This case is of unusual interest on account of this possible transmission. It suggests that the infection was transmitted through the placenta from the mother, who had widespread systemic infection, because five days after birth, with no evidence of a focus of infection, the child developed a marked swelling in both wrists and in the left knee, from which two weeks later gonococci were isolated.

Extraperitoneal Adenocarcinoma Secondary to Ovarian Tumor.—Stein cites the case of a woman, 29 years of age, who had been operated on when she was 19 years old. Nothing definite is known of this operation beyond the fact that the right tube, ovary and the appendix were apparently removed. When the patient came under Stein's observation ten years later, she presented a large extraperitoneally located adenocarcinoma, all of the carcinomatous tissue being of ovarian origin; the tumor was located in the pelvic glands and developed between the outer two thirds of the broad ligament, i. e., extraperitoneally. She presented another tumor of similar structure in the left inguinal region. Postmortem examination revealed no primary tumor. The question then arises, where did this unusual type of carcinoma have its origin? There are several possibilities. First, the case may be a slow growing recurrence from an original ovarian tumor removed at the time of the first operation, ten years ago. (Nothing definite could be ascertained of this operation.) Secondly, the growth may have developed from a supernumerary ovary, extraperitoneally located between the folds of the broad ligament. Thirdly, it may have developed in Mueller's duct. In Stein's opinion the first supposition is the most logical.

American Journal of Public Health, Detroit

13: 441-530 (June) 1923

Epidemiology from Point of View of State Department of Health. F. G. Boudreau, Columbus, Ohio.—p. 459.
Domestic Carbon Monoxid Poisoning from Gas Stoves. E. R. Hayhurst, Columbus, Ohio.—p. 462.
Scarlet Fever in State Juvenile Home. D. M. Griswold, Iowa City, Ia.—p. 465.

Serum Lysins. R. W. Pryer, Detroit.—p. 470.
Wassermann and Kahn Precipitation Tests Compared in 900 Cases. A. D. Dulaney.—p. 472.
Comparative Study of Mediums for Quantitative Estimation of Bacteria in Milk. M. Frobisher, Jr.—p. 474.
Chlorination of Swimming Pool Water. W. D. Stovall and M. S. Nichols.—p. 478.

American Journal of Tropical Medicine, Baltimore

3: 159-268 (May) 1923

Hookworm Disease as Related to Industry in Australia. W. A. Sawyer, Brisbane, Aust.—p. 159.
*Toxicity of Carbon Tetrachlorid. J. R. Meyer and S. B. Pessoa, Sao Paulo.—p. 177.
*Effect of Carbon Tetrachlorid on Intestinal Protozoa. M. J. Hogue and C. Van Winkle, Greensboro, N. C.—p. 197.
*Etiology of Blackwater Fever. I. J. Kligler, Jerusalem.—p. 203.
Acetic-Alcohol Fixation for Parasitic Amebas and for Tissues. R. W. French, Washington, D. C.—p. 213.
Moscow Tropical Institute. Sh. Moshkovsky.—p. 225.
*Etiology of Dengue Fever. A. C. Chandler, Houston, Tex., and L. Rice, Galveston, Tex.—p. 233.

Toxicity of Carbon Tetrachlorid.—Among a group of persons suffering from uncinariasis who were treated with carbon tetrachlorid according to Hall's method, and with doses equal to those which he recommends, Meyer and Pessoa saw three cases with severe attacks of pain in the lumbar regions. One patient had marked hematuria, and various other symptoms which also occurred in other members of the group. Experiments were made on dogs to determine the influence of tetrachlorid on the various organs. The most marked lesions were observed macroscopically and microscopically in the liver and kidneys. The severity of these lesions seems to vary in inverse ratio to the age of the animal. The severity of the liver necrosis is in direct proportion to the dose administered, although occasionally hypersusceptibility to carbon tetrachlorid was observed. The liver necrosis appears to be brought about by the same mechanism as that from chloroform intoxication. The renal lesions are less severe than those in the liver and develop more slowly. Both liver and kidneys show active power of regenerating the destroyed parenchyma. Carbon tetrachlorid is a powerful vermifuge. When administered in doses of 0.3 c.c. per kilogram of body weight it removed all ancylostomes in dogs. The authors warn that the administration of this vermifuge should be undertaken with caution in human beings and that the doses recommended by Hall may be too large.

Dose of Carbon Tetrachlorid.—Carbon tetrachlorid in doses of 1 c.c., according to Hogue and Winkle, is not specific for the treatment of infections of *Giardia* and spirochetes in kittens. Carbon tetrachlorid in 3 c.c. doses is not a specific for the treatment of human infections of *Giardia intestinalis, Trichomonas hominis, Chilomastix mesnili, Endolimax nana* and *Iodamoeba williamsi.* Carbon tetrachlorid has no permanent effect on intestinal protozoan infections. Infections of *Trichomonas hominis* and *Chilomastix mesnili* persist in spite of the full dosage, i. e., 3 c.c. Infections of *Giardia intestinalis* appear at times to be affected. Cysts will disappear from the stools for a few days after treatment. However, this is characteristic of *Giardia* infections. Various authors have already shown that the cysts of *Giardia* appear in the stools at irregular intervals, often several days apart so that their disappearance from the stools of these patients under treatment cannot be taken as due to the effect of carbon tetrachlorid. The same appears to be true for *Endolimax nana* though less is known about this infection.

Blackwater Fever: Mechanism of Hemoglobinuria.—The observations reported by Kligler seem to have a bearing on the mechanism of quinin hemoglobinuria. It appears that, in the presence of bile, quinin becomes highly hemolytic even in the small doses ordinarily employed in the treatment of malaria. Some as yet undetermined constituent of bile had the power of rendering quinin hemolytic in one-tenth the concentration usually required. If it is assumed that the substance in question is liberated during the active destruction of blood cells in the course of repeated attacks of malaria, a simple theory of the mechanism of hemoglobinuria suggests itself. Hemoglobinuria patients invariably give a history of repeated attacks of malaria. In the course of these attacks cell products are constantly liberated in the circulation which at times may not be readily eliminated and thus reach a concentration higher than normal. The injection of quinin at that time causes hemolysis and hemoglobinemia which manifests itself by the appearance of hemoglobin in the urine.

Etiology of Dengue Fever.—Negative findings in blood, in inoculated animals (particularly guinea-pigs), and in cultures; the usual absence of liver and kidney involvements; the fact that the relationship of dengue to yellow fever has been overemphasized; and the viability of the virus in blood kept in an ice chest after removal from the host (according to Cleland, Bradley and MacDonald), lead Chandler and Rice to believe it improbable that the organism of dengue is a *Leptospira.*

Archives of Internal Medicine, Chicago

31: 783-934 (June 15) 1923

Clinical Significance of Abnormalities in Urine Volumes. T. Addis, San Francisco.—p. 783.
*Physiology of Liver. IV. Effect of Total Removal of Liver After Pancreatectomy on Blood Sugar Level. F. C. Mann and T. B. Magath, Rochester, Minn.—p. 797.
*Production of Urinary Calculi by Devitalization and Infection of Teeth in Dogs with Streptococci from Cases of Nephrolithiasis. E. C. Rosenow, and J. G. Meisser, Rochester, Minn.—p. 807.
*Study of Macrophages in Human Blood with Special Reference to Their Presence in Two Cases of Subacute Bacterial Endocarditis. J. J. Sampson, W. J. Kerr, and M. E. Simpson, San Francisco, Calif.—p. 830.
Primary Carcinoma of Thymus: Report of Case. V. C. Jacobson, Albany, N. Y.—p. 846.
*Stokes-Adams' Disease Due to Gumma of Heart. R. H. Major, Kansas City Kan.—p. 857.
Hydrogen-Ion Studies. VII. Experimental Nephritis in Rabbits with Monobasic Sodium Phosphate. E. F. Hirsch, Chicago.—p. 862.
Dilatation of Pulmonic Area of Heart and Its Significance. J. A. Honeij, Boston.—p. 866.
*Blood Gases in Auricular Fibrillation and After Restoration of Normal Mechanism. H. J. Stewart, Baltimore.—p. 871.
Experimental Uranium Nephritis: Chemical and Pathologic Study. F. R. Nuzum and L. L. Rothschild, Santa Barbara, Calif.—p. 894.
Vital Capacity in Hyperthyroidism. Influence of Posture: Preliminary Report. I. M. Rabinowitch, Montreal.—p. 910.
Studies on Potassium Content of Human Serum. L. Wilkins and B. Kramer, Baltimore.—p. 916.
*Some Unusual Disturbances of Mechanism of Heart Beat. F. N. Wilson, and G. R. Herrmann, Ann Arbor, Mich.—p. 923.

Effect of Hepatectomy and Pancreatectomy on Blood Sugar.—The liver and pancreas were removed by Mann and Magath at varying intervals in relation to each other. When the two glands were removed at the same time, the resulting condition was the same as though only the liver had been removed. When the liver was removed from twenty-four to ninety-six hours after pancreatectomy, the blood sugar decreased quickly and the same characteristic symptoms developed as after hepatectomy, but at a higher blood sugar level. The injection of glucose restored the animal to a normal state, but the effect of the glucose was transitory. The total removal of the pancreas and partial removal of the liver in an animal in which an Eck fistula had been made was followed by only slight or no increase in blood sugar. These experiments are said to prove that the presence of the liver is absolutely necessary for the hyperglycemia following pancreatectomy.

Urinary Calculi Produced by Focal Infection of Teeth.—The results of their experiments, and of clinical study made by Keyser and Braasch and others, Rosenow and Meisser assert indicate that the factor of focal and other infections should be given thorough consideration in the management of cases of nephrolithiasis. The demonstration of the presence of the micro-organisms precisely where precipitation and crystallization begin suggests strongly that the mechanism of the production of stone is largely a local process and that the reactions incited produce the physicochemical conditions necessary, such as the nucleus and organic framework, for the formation of calculi. The common occurrence, however, of unusually large numbers of calcium oxalate and other crystals in the urine and in the medulla of the kidneys of the dogs that developed calculi, and the loss in weight, suggest that more general effects of infection may also play a part. The conclusion that primary urinary calculi are often due to streptococci which have elective affinity for the urinary tract and, it would seem, specific power to incite the conditions

necessary for their formation, the authors state, seems justified.

Study of Macrophages.—In two cases of subacute bacterial endocarditis, cells foreign to the normal blood stream were observed by Sampson, Kerr and Simpson. They varied in size from 10 to 80 microns. The nucleus was round, oval, indented or multiple. These cells were markedly phagocytic with vacuoles containing engulfed cells, possibly bacteria, and unidentified material in all stages of disintegration. With Giemsa stain, marked fine azurophilic granulation of the cytoplasm was observed. By supravital staining, from six to seventy or more granules were noted in the segregation apparatus. Intermediate forms, varying from the cells just described to normal appearing transitional cells, were also observed. Their fluctuations were rapid but without periodicity, and varied from zero to 48 per cent. They varied directly with the number of platelets, inversely with the bleeding time, and descreased at the time of death. There was an increase from three to fifteen hours after transfusion. The fluctuations were evidently not associated with changes of temperature, pulse, respiration, digestion or sudden changes of physical or mental status. Certain deductions are made as to origin, cause of production and release, mode of removal and function of these cells through parallelisms of their behavior with similar cells produced experimentally.

Heart Block Due to Gumma in Heart.—The case of heart block due to gumma of the heart reported by Major is said to be the twelfth on record. The anatomic diagnosis was: gumma of the heart; aortic stenosis; aortic insufficiency; pulmonary insufficiency; hypertrophy and dilation of the heart, syphilitic aortitis.

Advantages of Quinidin Therapy.—The advantages of quinidin therapy, Stewart says, seem to be four: (1) Marked subjective improvement of the patient under the normal mechanism. (2) Great increase in the cardiac reserve. (3) Improved pulmonary ventilation. (4) Improvement in the oxygen saturation of the venous blood, and on the basis of the coefficient of ultilization, improvement in the peripheral systemic blood flow. Fifteen cases of auricular fibrillation were studied from the point of view of the blood gases.

Disturbances of Mechanism of Heart Beat.—Wilson and Herrmann report four cases: (1) an ectopic tachycardia of fifteen months' duration; (2) toxic depression of the conductivity of the Purkinje system; (3) transient complete bundle branch block, and (4) Stokes-Adams attacks due to the sudden onset of complete block.

Arkansas Medical Society Journal, Little Rock

20: 1-15 (June) 1923

Cancer of Female Breast; Factors Influencing Best Surgical Results. J. N. Jackson, Kansas City, Mo.—p. 1.
Radiotherapy in Treatment of Bone Tuberculosis and Other Conditions. J. D. Southard, Fort Smith.—p. 6.

Boston Medical and Surgical Journal

188: 975-1022 (June 21) 1923

Some Peripheral Nerve Problems. D. Lewis, Chicago.—p. 975.
*Heart Disease in Pregnancy. W. B. Breed and P. D. White, Boston.—p. 984.
Id. B. E. Hamilton, Boston.—p. 987.
Infectious Colitis. H. F. Hewes, Boston.—p. 994.
Surgical Treatment of Ulcerative Colitis. D. F. Jones, Boston.—p. 999.
Practical Management of Dysmenorrhea. S. R. Meaker, Boston.—p. 1000.
Cancer of Cervix Uteri. W. P. Graves, Boston.—p. 1006.

Heart Disease in Pregnancy.—The 102 cases analyzed by Breed and White demonstrate two features which they emphasize: First, the importance of separating at the very outset the patients with organic heart disease from those in whom there is no disease or muscle insufficiency; and second, the relatively slight significance of specific value injuries in relation to cardiac prognosis. Among the 102 women, forty-nine had no organic heart disease; that is, it was impossible to demonstrate any structural change or impairment of cardiac function. These patients presented various symptoms of palpitation, tachycardia, nonprogressive weakness, and irritability. Such symptoms were generally associated with the presystolic murmurs at the apex or base, premature ventricular beats, and marked sinus arrhythmia. None showed diastolic murmurs. The diagnoses included in this group were: effort syndrome, irritable heart, and normal heart. On the strength of such diagnosis, they all were advised to proceed through labor without treatment or more than normal observation. Each woman was delivered routinely without showing signs of cardiac damage. Disposing thus of those cases in which no prognostic decision was necessary, there remain fifty-three cases which showed evidence of organic heart disease, and all were of so-called rheumatic origin. Death occurred in two cases, in one from acute endocarditis, superimposed on a chronic infection (mitral stenosis and aortic regurgitation) and in one from auricular fibrillation in mitral stenosis. The former survived a vaginal cesarean section at four months, but died at home one month later. The latter died a few hours after delivery. Thirteen cases were interfered with, either at the time seen or at term, by abdominal cesarean section. Of those that were not interfered with, none died, but two patients with marked mitral stenosis, in whom intervention was advised refused operative procedure and passed through pregnancy to normal deliveries without cardiac failure. Cases of mitral stenosis occurred most often in those women who suffered most failure, but not oftener than the incidence of this lesion in rheumatic heart disease would warrant. The authors summarize as follows: Approximately 50 per cent. of pregnant women who present cardiac symptoms or signs have no organic heart disease. Heart disease in pregnancy is almost invariably rheumatic in type. Individual prognosis must be based on functional capacity rather than on structural change.

Journal of Experimental Medicine, Baltimore

37: 733-888 (June) 1923

*Relation Between Blood Destruction and Output of Bile Pigment. G. O. Broun, P. D. McMaster and P. Rous, New York.—p. 733.
Action of Serum on Fibroblasts in Vitro. A. Carrel and A. H. Ebeling, New York.—p. 759.
*Separation of Toxins of Bacillus Dysenteriae Shiga. J. E. McCartney and P. K. Olitsky, New York.—p. 767.
Virulence of Epidemic Strain of Bacillus Pestis Caviae. L. T. Webster, New York.—p. 781.
Production of Antibodies in Rabbits by Simplified Intratracheal Method. F. S. Jones, Princeton, N. J.—p. 789.
*Studies Based on Malignant Tumor of Rabbit. III. Intratesticular Transplantation and Clinical Course of Disease. W. H. Brown and L. Pearce, New York.—p. 799.
Id. IV. Results of Miscellaneous Methods of Transplantation. L. Pearce and W. H. Brown, New York.—p. 811.
Deposition and Subsequent Course of Particulate Material (Manganese Dioxid and Manganese Meta-Silicate) Administered Intravenously to Cats and to Rabbits. C. K. Drinker, L. A. Shaw and K. R. Drinker, Boston.—p. 829.
Arsenical Compounds in Treatment of Blackhead in Turkeys. E. E. Tyzzer, Boston.—p. 851.

Relation Between Blood Destruction and Output of Bile Pigment.—In dogs intubated for the collection of all bile, Broun et al. noted a marked falling off in the yield of bilirubin after operation, followed soon by anemia of secondary character. Though, in the absence of complications, the anemia is mild, it persists despite the excellent general condition of the animal. Intercurrent changes in the hemoglobin percentage take place from time to time, and these are accompanied by very similar fluctuations in the bilirubin quantity. Evidently there is a process of pigment conservation which varies in proportion to the body need.

Separation of Dysentery Bacillus Toxins.—By the suppression, through anaerobiosis, of the exotoxin-producing activity of *Bacillus dysenteriae* Shiga, a pure endotoxin was produced by McCartney and Olitsky directly from the culture. The duality of the poison of Shiga bacillus is further substantiated by studies on the diffusion of exotoxin, or neurotoxin, and endotoxin, or enterotoxin, by means of colloidion sacs, implanted intra-abdominally in rabbits or placed in vitro.

Transplantation of Sarcoma.—From an analysis of the results obtained with reference to the operation of various factors, the conclusion was reached by Pearce and Brown that while the quality of malignancy displayed by the tumor was conditioned by the capacity for growth of the tumor cells, the degree of malignancy exhibited in any given instance was a function of animal resistance which was not entirely specific but corresponded closely with the ability of the animal to meet excess demands arising from other causes and, to

this extent, represented an expression of the functional capacity of a mechanism which is concerned primarily with the maintenance of the general animal economy.

New Orleans Medical and Surgical Journal

75: 749-824 (June) 1923

Diagnosis of Hip Disease. Cases Illustrating Common Errors. E. D. Fenner, New Orleans.—p. 749.
Facts and Fancies. W. T. Patton, New Orleans.—p. 761.
Clinical Significance of Interpolated Extrasystoles. L. F. Bishop, New York.—p. 766.

New York Medical Journal and Medical Record

117: 649-720 (June 6) 1923

Diagnosis and Treatment of Gallbladder Lesions. M. Einhorn, New York.—p. 649.
Duodenal Motility. H. Wheelon, Seattle, Wash.—p. 652.
Duodenal Alimentation. J. Friedenwald and P. Wiest, Baltimore.—p. 655.
Etiology of Gastroduodenal Ulcer: Why the Stomach Does Not Normally Digest Itself. E. Pahler, New York.—p. 659.
Surgical Treatment of Gastric and Duodenal Ulcer. J. J. Wells, New York.—p. 663.
Oxalic Acid Production in Colon as Factor in Disease Causation. C. W. Lieb, New York.—p. 665.
Diagnosis of Acute Surgical Diseases of Upper Abdomen. R. F. Ward, New York.—p. 667.
Upper Abdominal Disease in Relation to Insurance Risks. M. Behrend, Philadelphia.—p. 669.
Carcinoma, with Especial Reference to Alimentary Tract. W. E. Clark and M. W. Perry, Washington, D. C.—p. 672.
Carcinoma of Esophagus. J. M. Marcus and E. A. Aronson, New York.—p. 675.
Subhepatic Abscess Secondary to Appendicitis. P. W. Aschner, New York.—p. 679.
Rôle of Bacillus Welchii in Gangrenous Appendicitis: Use of Antitoxin of Bull and Pritchett in Treatment. J. E. Jennings, Brooklyn.—p. 682.
Diagnosis of Appendicitis. L. Drosin, New York.—p. 686.
Value and Limitations of Roentgen-Ray in Diagnosis of Chronic Appendicitis. L. Levyn, Buffalo.—p. 688.
Tuberculosis Within Rectum. C. V. Drueck, Chicago.—p. 690.
*New Type of Drain for Use in Anorectal Fistulas. J. F. Montague, New York.—p. 692.
Instrumental Aid to Sigmoidoscopy. D. C. McKenney, Buffalo.—p. 693.
Duodenal Intestinal Obstruction, Secondary to Gastric Polyp, and Intussusception Due to Multiple Teniae Saginatae. J. W. Shuman and D. Cruikshank, Beirut, Syria.—p. 694.
Thrombosis of Superior Mesenteric Vessels and Volvulus of Small Intestine. Resection and Recovery. D. H. Orgel, New York.—p. 695.

Drains for Anorectal Fistula.—The drains used by Montague consist, essentially, in a roll of absorbent cotton a quarter inch in diameter and 4, 6 or 8 inches in length. Through the center of this roll is run a piece of stout tape which extends beyond the roll for about 3 inches. The object of the latter is to serve for traction when it is desired to remove the drain, the cotton itself becoming very friable when wet. These rolls may be saturated with whatever medication is to be applied to the fistulous wound. More medication may be conveyed in this manner than with the gauze drains, and, in addition, the cotton rolls give up the medicaments more readily. Should one drain be insufficient to keep the walls of the wound apart, two or three may be used. The roll drains are small enough in diameter to allow three or more to be placed in a wound without causing so much pressure that granulation is impeded or reunion of the sphincteric fibers prevented.

Ohio State Medical Association Journal, Columbus

19: 393-480 (June) 1923

Aortic Aneurysm with Spontaneous Pneumothorax: Report of Case. C. F. Anderson and H. W. Retan, Mt. Vernon.—p. 397.
Biliary Lymphangitis. W. H. Fisher, Toledo.—p. 400.
Diseases of Pericardium. R. S. Morris and C. F. Little, Cincinnati.—p 404
Otolaryngologic Clinics of Vienna of Today. A. L. Stotter, Cleveland.—p. 414.
*Treatment of Subacute and Chronic Arthritis with Milk Injections. C. DeCourcy, Cincinnati.—p. 416.
Differentiation of Skin Eruptions in New-Born. L. P. Howell, Columbus.—p. 417.
Lipoids. H. Iscovesco, Paris, France.
Present Day Knowledge in Treatment of Pneumonia. J. Anderson, Cleveland.—p. 423.

Milk Injections in Arthritis.—In forty-two cases of subacute and chronic arthritis DeCourcy resorted to the intramuscular injection of milk. The solutions were prepared by heating milk (first removing the top milk) at 100 C. for twenty minutes. Injections of about 10 c.c. of this milk were given deep into the muscles of the buttock, and repeated every four or five days, depending on the reaction. The patients invariably noted an amelioration of symptoms and a feeling of well being within from twenty-four to forty-eight hours after injections. The injections were usually followed in six or eight hours by a rise in temperature, which dropped to normal in from twenty-four to thirty-six hours. The leukocyte count was raised, polymorphonuclear leukocytes predominating, within twelve hours. The results, after six months observation, in the majority of chronic cases have been disappointing, although the patient suffered less pain than formerly. The deformity of the joints remained practically unchanged. In the subacute cases, in which the foci of infection were removed, there was complete amelioration of symptoms, nine cases being under frequent observation for a period of five months.

Southern Medical Journal, Birmingham

16: 407-494 (June) 1923

*Sugar Findings in Normal and Pathologic Spinal Fluids. A. G. Kelley, Atlanta, Ga.—p. 407.
Treatment of Arterial Hypertension. R. N. Jacksonville.—p. 411.
Congenital Syphilis. S. H. Welch, Birmingham, Ala.—p. 417.
Ultraviolet Ray Therapy in Dermatology. J. W. Jones, Atlanta, Ga.—p. 423.
*High Voltage Roentgen-Ray Therapy. R. H. Millwee, Dallas, Tex.—p. 427.
*Id. S. Moore, St. Louis.—p. 430.
Experience with Deep Therapy, 200 Kilovolts or more. D. Y. Keith and J. P. Keith, Louisville.—p. 435.
Diagnosis and Treatment of Certain Mediastinal Tumors (Sarcoma). W. S. Lawrence, Memphis.—p. 441.
Extending Health Span and Life Span After Forty. E. L. Fisk, New York.—p. 447.
Surgical Treatment of Hyperthyroidism. G. W. Crile, Cleveland.—p. 459.
Idiopathic Nephralgia. J. T. Geraghty and W. A. Frontz, Baltimore.—p. 462.
Treatment of Prostatic Tumor with Deep Roentgen-Ray Therapy. P. J. Gelpi, New Orleans.—p. 466.
Ovarian Cysts in Children: Report of Cases. B. C. Nalle, Charlotte, N. C.—p. 469.
Prepartum Care. Value of Early Diagnosis and Treatment of Certain Complications. T. B. Sellers and D. C. McBride, New Orleans.—p. 473.
Low Back Pain. R. W. Billington, Nashville.—p. 478.
Abscess of Temporosphenoidal Lobe Complicating Acute Mastoiditis: Operation and Recovery. E. G. Gill, Roanoke.—p. 483.
Clinical Observations Following Use of Mercury Cyanid in Lenticular Opacities. J. H. Burleson, San Antonio.—p. 486.
New Hemostatic Forceps. W. B. McWhorter, Anderson, S. C.—p. 490.

Sugar Content of Normal and Pathologic Cerebrospinal Fluid.—From his observations on the sugar content of cerebrospinal fluid in certain diseases and his effort to determine the influence of *Spirochaeta pallida* on the sugar content of cerebrospinal fluids, Kelley concludes that (1) the sugar content of cerebrospinal fluid is decreased in untreated cases of syphilis of the nervous system, in meningitis due to the meningococcus, *Staphylococcus aureus* and the pneumococcus, and in moribund cases; (2) as cases of syphilis of the nervous system are treated, the sugar content gradually approaches the normal and on this account repeated estimations of the sugar content of the cerebrospinal fluid in these cases may possibly be of prognostic value; and (3) that there is sufficient evidence to warrant the opinion that *Spirochaeta pallida*, when present in the cerebrospinal fluid, utilizes the sugar normally present in the fluid.

High Voltage Roentgen-Ray Therapy.—High voltage roentgen-ray therapy, in Millwee's opinion, is a distinct step forward in the treatment of malignancy. It offers a palliation never before obtained, and possibly a cure in many cases.

Id.—While endorsing the value of high voltage roentgen-ray therapy in cases of malignancy, Moore points out that it is merely a palliative not a cure. Experience in treating 214 cases over a period of six months would indicate that the earlier of these cases derived sufficient benefit to make this the therapeutic agent of choice. Even in advanced cases the relief of pain and the sometimes astonishing subjective improvement brought about by this method of treatment would indicate its application regardless of the hopelessness of effecting a cure.

FOREIGN

An asterisk (*) before a title indicates that the article is abstracted below. Single case reports and trials of new drugs are usually omitted.

British Medical Journal, London

1: 1043-1080 (June 23) 1923

*Cause and Treatment of Dyspnea in Cardiovascular Disease. J. Meakins.—p. 1043.
*Effect of Heat on Operations for Exophthalmic Goiter. A. J. Walton.—p. 1045.
*Intravenous Injections of Peptone as Aid to Vaccine Treatment. H. W. Crowe.—p. 1046.
*Carbon Tetrachlorid and Oil of Chenopodium in Helminthiasis. J. G. Reed.—p. 1048.
Extreme Case of Diffuse Syphilitic Fibrosis of Lungs. F. P. Weber.—p. 1049.
*Volvulus of Large Intestine. A. H. Southam.—p. 1050.
*Autoplastic Ovarian Transplantations. J. H. Nattrass.—p. 1051.
Case of Pituitous Catarrh. P. H-S. Hartley and I. J. Davies.—p. 1052.
Lacerated Kidney Due to Indirect Violence. J. C. Jefferson.—p. 1053.

Cause and Treatment of Dyspnea in Cardiovascular Disease.—The main feature emphasized by Meakins is that dyspnea in cardiovascular disease may be produced by anything that interferes with the proper aeration of the blood as it passes through the lungs, or by the influence of vascular engorgement on the respiratory movement and pulmonary ventilation. He terms these the pulmonary and the circulatory methods. As this condition is fundamentally due to lack of oxygen in the cell, it is naturally to be assumed that it can be relieved by supplying oxygen. The use of oxygen, however, does not remove the necessity for adopting other means of treating cardiac failure, and by no means the least important of these is physical and mental rest. The employment of drugs which increase the cardiac power is not to be ignored. Of these there is, in Meakins' opinion, only one of value, and that is digitalis.

Effect of Heat on Goiter Operations.—Walton has plotted out the percentage mortality among the cases of exophthalmic goiter operated on in the different months of the year; and whereas in February, March, April, May, September, October and November there is no mortality, in the three months of June, July and August the death rate is about 20 per cent. In January and December two deaths occurred. These figures, which were collected over a period of ten years, indicate that no operation in a case of exophthalmic goiter should be undertaken in extremely hot weather, for under such conditions the risk, in spite of all precautions, is too great.

Intravenous Injections of Peptone Aid Vaccine Treatment.—Intravenous injections of peptone were given by Crowe to seventy patients who were very sensitive to vaccines, with satisfactory results. Patients to whom he could not give 100,000 streptococci or the same number of *M. deformans* without producing a reaction and general malaise, after peptone treatment were able to tolerate much larger doses. The contraindications to the treatment are personal intolerance, grave anemia, severe illness, and chronic nephritis.

Carbon Tetrachlorid and Oil of Chenopodium in Helminthiasis.—It has been found by Reed that carbon tetrachlorid alone is a fairly efficient anthelmintic for ascaris, but in combination with oil of chenopodium it has a much higher efficiency and practically never fails. This combination is believed to be somewhat more effective than carbon tetrachlorid alone for a pure hookworm infection also. Doses up to 1 dram (4 c.c.) of carbon tetrachlorid alone are being given to adults. Formerly 80 minims (5 c.c.) were frequently given, but cases that were resistant to 1 dram (4 c.c.) were usually equally resistant to the larger dose. The dose is given first thing in the morning before eating, and no purge is given. The following treatment is routine for adults: one ounce (30 c.c.) of castor oil at night, and the next morning a mixture containing 1 dram (4 c.c.) of carbon tetrachlorid, 1 c.c. of oil of chenopodium, and 0.5 ounce (16 c.c.) of liquid petrolatum. As a rule, the feces are examined again a week to ten days after treatment, and, if necessary, the treatment is repeated. The immediate effect on the patients does not seem to be any more marked when this mixture is used than when the carbon tetrachlorid is given alone. Almost all patients complain of feeling drunk for a time, varying from a few minutes to a day. As a rule, three or four bowel movements are produced in the twenty-four hours following the treatment, and these often contain numerous worms (ascaris). Occasionally, slight vomiting, headache, or pain in the abdomen occur.

Volvulus of Large Intestine.—Southam reports three cases. In two it was the sigmoid that had become twisted, and in the third case it was the colon just above the sigmoid.

Autoplastic Ovarian Transplantation.—Nine years and seven months after ovarian transplantation was performed, the organs of Nattress' patient were still in a healthy condition. The sexual life of the patient had been quite normal. The grafted ovaries apparently discharged their functions quite as well as if they had not been grafted.

Indian Medical Gazette, Calcutta

58: 193-240 (May) 1923

Beriberi and Epidemic Dropsy Problem. J. W. D. Megaw.—p. 193.
Pharmacology and Therapeutics of Boerhaavia Diffusa. R. N. Chopra, S. Ghosh, B. N. Ghosh and P. De.—p. 203.
End-Results in Intracapsular Extraction (Smith's). F. F. S. Smith.—p. 208.
*Spleen Puncture Findings in Malaria. R. Knowles, H. W. Acton and S. A. S. B. Mohan.—p. 211.
Case of Intestinal Obstruction Complicated by Tetanus. F. J. W. Porter.—p. 213.
Fatal Case of Cerebral Contusion. A. C. Syam.—p. 214.
Cysticercus of Subconjunctival Tissues. R. E. Wright.—p. 215.
*Case of Food Sensitiveness. B. M. Chowdhury.—p. 216.
*Unusual Infection with Bacillus Pyocyaneus Simulating Leprosy. S. Mallannah.—p. 216.

Spleen Puncture Findings in Malaria.—Knowles et al. consider that there is no necessity to postulate either special parasite forms associated with malarial relapses or to assume the passage of parasites into either safe areas or into a resting phase. The authors consider that the etiology of malarial relapses may be explained on a purely mathematical basis. If the patient's powers of resistance are such that 98 per cent. of *Plasmodium vivax* parasites, for instance, are destroyed per forty-eight hour cycle, then cure, and, probably, permanent cure without relapse, is assured. If the destruction rate is lower, and at a figure of only from 90 to 94 per cent., the disease is still in its progressive phase. At a figure between 95 and 96 per cent., a condition of balanced equilibrium is reached at which schizogony is still proceeding at the normal rate; but the patient's powers of resistance are sufficient to keep the total number of trophozoites below the febrile threshold; while the brakelike factor introduced by gametocyte formation is also important in reducing the infection to afebrile limits. Should the patient's powers of destruction of merozoites become reduced from any adverse or extraneous cause, however, the destruction rate will fall; the schizogony success rate will be proportionately greater; a febrile dose of merozoites results and fever recurs.

Food Sensitiveness.—The peculiar features of Chowdhury's case were: (1) that the symptoms always appeared in the same order; (2) they had no relation to the nature of the food, as the condition occurred with diets of rice and milk, rice and boiled vegetables, mixed diet of rice, pulse, vegetables, fish, milk; (3) the attack usually occurred during the day; only one attack occurred during the night; (4) the attack occurred just at the end of or immediately after a meal; it never occurred at any other time; (5) the first and second eruptions appeared invariably over the same spots on the left wrist and the right supra-orbital ridge, respectively; (6) at the time of the attack the boy would go to sleep immediately on being put to bed; (7) the boy's father at about the same age had similar symptoms that continued until the age of 6 or 7 years.

Infection with Pyocyaneus Simulating Leprosy.—Mallannah's patient had perforating ulcers of the foot, one on the right heel and the other on the second toe. He had also white discolored patches over the left cheek and on the outer surface of the left arm, on the outer side of the left leg and on the dorsal surface of the left foot. These patches were not anesthetic. He also suffered from burning and tingling sensations in both feet. These symptoms resembled those of leprosy and, in fact, he was treated with gynocardate of sodium and sodium morrhuate, but without much benefit. He

had no nodules on the face and the ears were not thickened. His ulnar nerve on the left side seemed somewhat thickened. On examining scrapings from the ulcer, Mallannah was not able to find lepra bacilli, but he found *Bacillus pyocyaneus*. He prepared an autovaccine of *Bacillus pyocyaneus* from the patient which contained 100 million organisms per cubic centimeter. This was given subcutaneously every week. The ulcers completely healed after giving eight injections. The discolored patches were due to *Microsporon furfur* and cleared up completely when treated with sodium hyposulphite. The burning and tingling sensation of the feet also disappeared under vaccine treatment and the left ulnar nerve became normal.

Irish Journal of Medical Science, Dublin

5: 97-144 (May) 1923

*Cause of Death in Intestinal Obstruction. S. Pringle.—p. 97.
Hyperthyroidism. T. G. Moorhead.—p. 107.
Case of Extensive Fibrosis of Left Ventricle. E. C. Smith.—p. 118.
Posterior Ganglionitis with Anterior Poliomyelitis. J. O'Donnell.—p. 122.

Cause of Death in Intestinal Obstruction.—Pringle holds that intestinal toxemia has a large share in causing death in acute septic peritonitis. Three factors are at work in acute peritonitis: (1) shock; (2) septic absorption from the peritoneum; and (3) toxemia from the intestine, the involved part of which is generally in a condition of paresis, producing obstruction. Pringle argues that if the shock and toxemia be combated, there is a possibility of prolonging the patient's life sufficiently to give the fighting powers of the peritoneum a chance of dealing with the infection. Pringle gives morphin and saline-glucose infusions to combat the shock and toxemia, and does an enterostomy high up in the small intestine, after the manner of a Witzel's gastrostomy. An enterostomy after this fashion allows free escape of the toxic intestinal contents and, at the same time, permits the introduction of saline and glucose.

Japan Medical World, Tokyo

3: 95-122 (May) 1923

Organ or Tissue Cells as Irritant or Toxin. Creation of Organ Toxin. Y. Miyagawa.—p. 95.
Basal Metabolism in Vitamin B Starvation and in Beriberi. S. Okada, E. Sakurai, T. Ibuki and H. Kabeshima.—p. 102.
Classification of Bacillus of Pertussis, Vaccine Therapy and Prophylaxis for Whooping Cough. M. Hayano.—p. 104.

Journal of Neurology and Psychopathology, London

4: 1-102 (May) 1923

*Pathologic Anatomy of Ductless Glands in Dementia Praecox. M. E. Morse.—p. 1.
Osteogenetic Dural Endothelioma: True Nature of Hemicraniosis. W. G. Penfield.—p. 27.
Society and Criminal. C. S. Read.
Organic Nervous Diseases Supervening in Subjects of Old Infantile Paralysis or Old Infantile Hemiplegia. F. P. Weber.—p. 40.
Case of Occlusion of Right Posterior Inferior Cerebellar Artery. D. R. Gowler and B. M. Hope.—p. 43.

Pathologic Anatomy of Endocrines in Dementia Praecox.—The gonads, pituitary, thyroid and suprarenals have been studied by Morse in twelve male and fifteen female dementia praecox patients dying under 45 years of age. Sixteen patients had active gonads. The patients dying of accident or of acute diseases had active glands, except in one case, in which there was only slight spermatogenesis. In tuberculous cases the gonads were atrophic, and the testicles showed fibrosis. The patients who were emaciated at the time of death also had inactive glands. In two of the patients in whom the dementia praecox developed on a basis of feeblemindedness the testicles showed abnormalities. Two of the women (one originally feebleminded) presented signs of a genital infantilism. There was no correlation between atrophy of the sex glands and the duration of the mental disease or the degree of psychic deterioration. The conditions in the sex glands of the controls were essentially the same as in the dementia praecox cases for the same terminal diseases, with the exceptions of the feebleminded, the infantile and the emaciated cases. The pituitaries in a little less than half of the cases presented a fibrosis, which could be correlated to some extent with a similar condition in the gonads. The lesions in the suprarenals were such as are usually found in the diseases to which the patients succumbed. The thyroids showed changes less frequently than did the other endocrines. There was occasionally a mild glandular hyperplasia or increase of connective tissue. From the pathologic side there is very little evidence of a primary atrophy of the gonads in dementia praecox, with the possible exception of those cases developing on a basis of mental defect. The atrophy, when present, can be accounted for by the somatic diseases from which the patients suffered. There is no one uniform condition of the gonads or other endocrines in dementia praecox, dependent on the disease process.

Lancet, London

1: 1199-1250 (June 16) 1923

*Duration of Pregnancy in Its Medicolegal Aspect. T. W. Eden.—p. 1199.
*Unhealthy Tonsils Associated with Cervical Adenitis. W. G. Howarth and S. R. Gloyne.—p. 1202.
*Etiology of Indirect Inguinal Hernia. T. E. Hammond.—p. 1206.
*Drug Therapy in Disseminated Sclerosis. W. Johnson.—p. 1208.
Hyperthyroidism as Cause of Severe Uterine Hemorrhage Following Minor Vaginal Operations. A. W. Bourne.—p. 1210.
*Postmortem Findings in Two Cases of Hydrocyanic Acid Gas Poisoning. G. R. S. Thomas.—p. 1210.
Fibroma of Ovary. Report of Case. A. W. Owen.—p. 1211.
*Two Sporadic Cases of Infection: Bacillus Aertrycke, D. Firth and E. FF. Creed.—p. 1212.
Case of Lethargic Encephalitis Recognized by Change in Behavior. J. H. Gellatly.—p. 1213.

Duration of Pregnancy.—Eden submits that sufficient medical data have been accumulated to show that human pregnancy may be prolonged to a period of 336 calculated days, and that there is nothing in the meantime to show that even this figure is the outside limit beyond which prolongation of pregnancy is impossible. Further, cases of prolongation of pregnancy beyond 320 calculated days are so rare that alleged instances should be scrutinized very carefully, and confirmatory evidence should be forthcoming if they are to be accepted as authentic. The child would in all cases be much above the average weight of children born at term; moreover, the bodily dimensions of the child, would be also much above the average.

Diseased Tonsils and Cervical Adenitis.—A series of thirty-four enlarged tonsils from cases with marked cervical adenitis were examined histologically by Howarth and Gloyne. The chief histologic changes noted were (*a*) marked increase in the lymphoid tissue, and (*b*) lesions in the crypts—desquamation of epithelial lining, plugging of the orifices, dilatation of lumen into cystlike spaces, and occasionally the formation of minute abscesses. Every tonsil examined showed evidence of bacterial infection. Many different species of organisms were found, the maximum number of species found in one tonsil being seven, the average number three. The streptococcus was the commonest species noted. In a series of tonsils examined for the presence of pathogenic organisms, it was found that 56 per cent. possessed bacteria virulent for the mouse. These organisms were hemolytic and nonhemolytic streptococci, and pneumococci (Types I and IV). The hemolytic streptococci varied as to their virulence in the mouse. Bacteria demonstrated in sections (chiefly cocci) showed that the infection tended to follow a definite path, namely, through the stratified epithelium (generally in the crypts, where it is thinner than on the surface) into the diffuse lymphoid tissue, thence along the minute lymphatics of the connective tissue trabeculae to the capsule, whence they passed to the lymph tracts of the pharyngeal wall. In a separate series examined for tuberculosis, it was found that the giant cells were generally in the lymphoid tissue, being rarely seen elsewhere. In two cases actinomyces-like organisms were obtained, but there is reason to believe that they were not true ray fungi. The tonsils become infected with bacteria in the first few days after birth. It seems probable that tuberculosis is only a late infection, and that in the majority of cases the cervical adenitis is due to septic absorption from tonsils containing pyogenic organisms such as the streptococcus.

Etiology of Indirect Inguinal Hernia.—On the basis of anatomic and pathologic considerations, Hammond says, it is seen that, as the inguinal canal is very efficiently protected

from pressure acting from within the abdomen, the presence of a persistent patent funicular process does not signify that a hernia must necessarily form. This would take place only if the internal ring were exposed at a time when the intra-abdominal pressure was raised, which might follow some severe effort or a trivial accident leading to incoordination of the neighboring muscles. Bruising is not to be expected, and the severity of the symptoms will depend on the size of the aperture in the fascia transversalis; this, if small, leads to strangulation of the bowel, but, if large, the only symptoms present might be a feeling of something giving way or a passing pain. An onset, symptomless and, perhaps, delayed until puberty or later, is, therefore, not inconsistent with the saccular theory, by which alone can other points in the etiology of hernia be explained.

Diagnosis and Treatment of Disseminated Sclerosis.—The main points in the early diagnosis of disseminated sclerosis given by Johnson are: (1) the occurrence of repeated pyrexial attacks followed by groups of nervous symptoms which tend to improve in a few weeks; (2) age of onset (viz., the young adult); (3) certain nervous symptoms, chief among them being slight nystagmus, temporary diplopia, paresthesia of a fleeting character, blurred speech, evidence of spastic paralysis (e. g., absent or diminished abdominal reflex on one or both sides), exaggerated deep tendon reflexes with extensor plantar reflex on one or both sides, any or all of which symptoms may be transient; (4) negative Wassermann reaction; (5) a paretic type of curve with the colloidal gold reaction—in Johnson's experience an inconstant phenomenon. The success in treatment which has been attributed to certain remedies is said to be mainly due (1) to the remissions which independently occur in the disease, and (2) to the dissipation of certain hysterical aggravations of the organic symptoms. Intensive arsenical treatment has been resorted to by Johnson with much success in his last ten cases. The procedure has been a course of six weekly intravenous injections of neoarsphenamin 0.15, 0.3, 0.45, 0.45, 0.6, 0.6 gm., respectively, which is repeated at the end of six months. In the interval, and for a year subsequent to the second course of injections, the patient is given arsenic by the mouth. He is told to take a mixture containing 3 minims (0.2 c.c.) of liquor arsenicalis (B. P.), three times a day during alternate fortnights. Johnson believes that this treatment exerts some action toward the definite arresting of the pathologic process.

Necropsy Findings After Cyanid Poisoning.—The outstanding features which were common to the two cases recorded by Thomas were: absence of cyanid odor before opening the body, and absence of this smell from the urine; gaseous distention of peritoneal cavity and of intestines: smell of cyanid in all serous cavities; concentration of smell of cyanid in the lateral ventricles; intensity and precise color of facial lividity; blue nails; pink color of intestines and gastric mucosa; bright pink staining of intima of the aorta; uniform blue-green color of the liver; green color of gray matter of the brain; color and chemosis of the conjunctivae; lividity and engorgement of buccal, pharyngeal, esophageal and respiratory mucous membranes; extravasation of blood into the tissues of the stomach wall posteriorly in the region of the fundus; flabbiness of the myocardium; absence of putrefactive changes, of putrefactive odor and of the ordinary postmortem staining; and positive chemical and spectroscopic tests.

Bacillus Aertrycke Infection.—The first case recorded by Firth and Creed represented the usual type, in which sudden onset, pyrexia, diarrhea and vomiting, general abdominal pain and marked tenderness on palpation over the whole abdomen are the usual features. The case was sent to hospital as an "acute abdomen" and reached the medical wards with a provisional diagnosis of atypical typhoid fever, but clinical evidence and pathologic investigation soon corrected this error. In the second case, no suspicion of the causative agent was aroused, although some form of poisoning was suspected, and it was only after the examination of cultures from the cadaver that *Bacillus aertrycke* was implicated. In neither instance was any other member of the household affected, nor was the source of the infection traced.

1: 1251-1298 (June 23) 1923

Oxidative Mechanism in Living Cell. F. G. Hopkins.—p. 1251.
Mild Smallpox. J. H. Garrett.—p. 1254.
Ethyl Chlorid, as an Anesthetic for Minor Operation in Children. S. F. Rose.—p. 1258.
Rocking Slide Precipitation Test (S. G.) for Syphilis. A. H. Priestley.—p. 1260.
*Case of Chloroma. H. T. Ashby and A. Sellers.—p. 1263.
*Fatality of Puerperal Fever. R. Dudfield.—p. 1264.

Chloroma Not Leukemic.—The case cited by Ashby and Sellers resembles previously reported cases of chloroma but differs in some respects. The color of the growth was not absolutely characteristic. Apart from the changes in the spleen, it affords no evidence in favor of the view that chloroma is allied to the leukemias. The association of tuberculosis of the lungs and bronchial glands, followed by a miliary tuberculosis, modified the progress of the disease and the changes in the organs. The illness in this case lasted only six weeks. A week before death the eyeballs became greenish and inflamed, and the eyelids could not be closed. Headache was a prominent feature toward the end. The temperature on admission was 100 F., and rose to 105 F. on the day before death.

Fatality of Puerperal Fever.—For 1921, 2,211 cases of puerperal fever were notified in England and Wales and 1,171 deaths were assigned to "puerperal sepsis," a fatality rate of 52.9 per cent. Dudfield feels that this rate cannot be accepted at its face value. Something is wrong with the classification.

Medical Journal of Australia, Sydney

1: 543-570 (May 19) 1923

Psychotherapeutic Practice. J. V. McAree.—p. 543.
Medical Benevolent Association of South Australia. J. C. Verco.—p. 547.
Glycosuria. A. E. Mills.—p. 549.
*Mite Infestations of Man. R. W. Cilento.—p. 552.
*Anaphylaxis with Sudden Onset. T. A. B. Harris.—p. 554.
Four Cases of Tetanus in Children. J. W. Grieve, R. Southby, L. Stokes and B. L. Stanton.—p. 555.

1: 571-598 (May 26) 1923

Albuminuria in Young People. S. F. McDonald.—p. 571.
Renal Efficiency Tests. M. G. Sutton.—p. 574.
Recovery from Hemophilia After Operation for Ruptured Appendix. P. L. Hipsley.—p. 584.

1: 599-616 (June 2) 1923

Measurement of Intelligence of School Children. G. E. Phillips.—p. 599.
Dysenteric Infections in Australia. C. H. Shearman.—p. 604.
Cesarean Section and Hysterectomy in Patient with Contracted Pelvis and Occipitoposterior Presentation. H. C. E. Donovan.—p. 609.

Mite Infestation of Man.—Investigation, initiated in the search for possible affinities between the epidemic glandular fever of Queensland and Japanese river fever, revealed the presence in tropical Australia and its dependencies of a considerable number of varying species of mites. During the course of this investigation two cases of infestation by *Liponyssus bursa* (Berlese) came to Cilento's notice. These two cases seem to be the first reported from these areas.

Anaphylaxis with Sudden Onset.—In Harris' case the symptoms of shock appeared forty-five minutes after the injection of 1,500 units of antitetanic serum.

Naval Medical Association Bulletin, Tokyo

39: 1-4 (March) 1923

Experimental Studies on Influence of Testis or Its Preparations on Pituitary and Testes. S. Koide.—p. 1.
Relation of Beriberi and Body Weight. Z. Kawaguchi.—p. 2.
Quantitative Determination of Vitamin B. S. Sakamoto.—p. 3.
Disinfection of Vegetables. S. Matsuda.—p. 3.

40: 5-7 (May) 1923

Syphilitic Serum Reaction. R. Mashimo.—p. 5.
Nonacid Dysentery Bacillus. A. Tanaka.—p. 6.
Untoward Reaction (Vagotony) Caused by Inoculation of Triple Vaccine. T. Iijima.—p. 6.
Relation of Albuminuria to Various Activities in Navy. B. Yoshisumi.—p. 7.

South African Medical Record, Cape Town

21: 217-240 (May 26) 1923

Infective Tonsillar Disease. W. P. Mulligan.—p. 217.
Id. Predisposing Factors, Particularly in Children. C. H. Kruger.—p. 219.

Id. Symptomatology. J. Luckhoff.—p. 220.
Id. Diagnosis. R. L. Scott.—p. 221.
Id. Prognosis. C. E. Jones-Phillipson.—p 223
Id. Treatment. Smuts.—p. 224.
Anesthetics in Tonsillar Surgery. G. W. B. Daniell.—p. 226.
Outline of Medical History. M. R. Drennan.—p. 228

Bulletin de l'Académie de Médecine, Paris

89: 519-546 (May 15) 1923

*Prevention of Tuberculosis in Infants. Bernard and Debré.—p. 523.
*Mixed Infection in Pulmonary Tuberculosis. Courmont and Boissel.—p. 533.
Method of Preparation of Organotherapeutic Products. A. Sartory and P. Pellissier.—p. 537.
*Titration and Toxicity of Insulin. Chabanier et al.—p. 539.

Prevention of Tuberculosis in Infants.—Bernard and Debré see the basis of all prophylaxis in infants in a complete separation from the source of infection, especially the tuberculous mother. Tuberculosis of the infant is not always fatal, if superinfections are avoided. They describe the work and results of centers which take care of infants from tuberculous parents.

Mixed Infection in Pulmonary Tuberculosis.—Courmont and Boissel examined 568 specimens of sputum microscopically and by cultures: 30 per cent. of the patients had only tubercle bacilli in the sputum; 51 per cent. had only a few other germs. In 19 per cent. the other microbes seemed to be important. Autovaccines did not produce any effect.

Titration and Toxicity of Insulin.—Chabanier, Lobo-Onell and Lebert found, contrary to Delezenne, that untoward effects after injections of insulin are due to the hypoglycemia which it induces, and not to the insulin directly.

Bulletin Médical, Paris

37: 613-640 (May 26) 1923

*Nervous Origin of Diabetes Insipidus. Camus and Roussy.—p. 619.
*Diabetes Insipidus. J. Lhermitte.—p. 623.
Clinical Aspects of Diabetes Insipidus. L. Binet.—p. 627.
*Impressions of America. Pouey.—p. 629.

Origin of Diabetes Insipidus.—Camus and Roussy assert that polyuria has never followed removal of the pituitary in dogs unless the base of the brain was damaged during the operation. Superficial injury of the base of the brain alone, even without removal of the pituitary, will bring on polyuria, and if the injury is extensive, polydipsia ensues. This region of the tuber cinereum, and not the pituitary, seems to control the water content of the organism. Experiments in this line always failed in puppies, as the regulating mechanism is not developed enough for perfect function in the very young organism. The mechanism of polyuria after injury of the tuber is still obscure; it occurs when the entire nerve supply to the kidneys has been cut. One dog has presented this experimental diabetes insipidus for three years to date, and some dogs, weighing 6 kg., void more than 3 liters of urine daily. Camus and Roussy explain the action of pituitary extract in the treatment of diabetes insipidus as a relief from compression by checking irritation of the base of the brain. Similar relief may be obtained by lumbar puncture. The literature of the last two years confirms their view that diabetes insipidus is due to a lesion of the infundibulum and tuber cinereum.

Differential Diagnosis of Diabetes.—Lhermitte incriminates some endocrine secretion in addition to the lesion in the infundibulum and floor of the third ventricle in the etiology of essential polyuria. He analyzes the data differentiating it from the polyuria secondary to polydipsia in chronic kidney disease, hysteria, epilepsy and dipsomania. A tumor almost anywhere in the brain, meningo-encephalitis of the base, or trauma, is the usual etiologic factor, as diabetes insipidus is not a morbid entity.

Impressions of America.—Pouey of Montevideo describes the work and home of Prof. George Crile.

37: 643-670 (June 2) 1923

Virulent Diseases. Louis Pasteur, 1880.—p. 649.
Pasteur. Bordet (Brussels).—p. 652.
*Pasteur. P. Mauclaire.—p. 658.

Pasteur.—In his reminiscences, Mauclaire quotes Pasteur's remark that he had attended the theater not more than ten times in all his life. "Travaillons, il n'y a que cela qui amuse. The laboratories are the temples of the future."

Bulletins de la Société Médicale des Hôpitaux, Paris

47: 609-643 (April 27) 1923

*Glycemia with Cancer in Digestive Tract. Le Noir et al.—p. 609.
*Bronchus Draining Tuberculous Cavity. Ameuille and Levesque.—p. 612.
Cardiac Psychosis with Insufficiency of Left Ventricle. Targowla.—p. 615.
*Fulminating, Febrile General Paralysis. Mignot and Marchand.—p. 618.
Combined Radiotherapy of Lymphadenitis. Saidman and Robine.—p. 622.
Epidemic Encephalitis with Labial Herpes. Laignel-Lavastine and Largeau.—p. 625.
Ocular Myoclonia. D. E. Paulian.—p. 630.
Case of Stasibasiphobia with Functional Paraplegia and Asthmatoid Attack. D. E. Paulian.—p. 632.
*Polyneuritis from Emetin. Ardin-Delteil et al.—p. 633.
Syphilitic Meningoradiculitis with Froin's Syndrome. Ardin-Delteil et al.—p. 635.
Hyperextension of Head and Dolichocephalism in Infants. L. Ribadeau-Dumas and A. Fouet.—p. 640.

Glycemia with Cancer of Alimentary Canal.—Le Noir, de Fossey and Richet examined the blood sugar content during fasting and after intake of 50 gm. of glucose. They found that the figures obtained in beginning carcinomas and cachectic patients are about the same as in normal controls. About one half of the patients with fully developed symptoms had hyperglycemia.

Draining Bronchus of Tuberculous Cavities.—Ameuille and Levesque call the bronchus leading from a cavity "the draining bronchus." They found that it is apparent on roentgenograms because of the thickening of its walls. It may thus serve to diagnose an indistinct cavity.

General Paralysis.—Mignot and Marchand report the history of a case of early general paralysis with quick progress and fever. The necropsy did not reveal any other cause for the fever.

Polyneuritis from Emetin.—Ardin-Delteil, Azoulay and Salles report a case of polyneuritis due to an overdose of emetin. The patient who suffered from dysentery received by mistake 1.22 gm. of emetin (besides 0.9 gm. neoarsphenamin) in less than forty days. He recovered from the dysentery but had a severe polyneuritis for three weeks.

Paris Médical

13: 285-300 (March 31) 1923

*Nervous Disturbances in Pulmonary Tuberculosis. Perrin and Yovanovitch.—p. 285.
Splenopneumonia and Encysted Pleurisy. Ardin-Delteil et al.—p. 287.
*Wound in the Heart. H. Mondor.—p. 290.
*Complement Fixation in Tuberculosis. A. Hanns.—p. 291.
Enterococcus Septicemia, Followed by Typhoid. Colombe and Foulkes.—p. 293.
Laryngeal Tuberculosis Cured for Two Years to Date. Rosenthal.—p. 296.
Vicious Circles. J. T. A. Walker.—p. 297.
Traumatic Movable Kidney with Chronic Appendicitis. Krafft.—p. 298.

Disturbances of the Vegetative Nervous System in Pulmonary Tuberculosis.—Perrin and Yovanovitch examined the vegetative nervous system with the usual tests in forty-nine patients with pulmonary tuberculosis. They tried, however, to use a smaller amount of pilocarpin, because the patients were hypersensitive, and distinguish between local and general disturbances of the vegetative nervous system. They found in 15 per cent. of the patients an increased tonus of the sympathetic, and in 42 per cent. vagotonia. Other patients had a lowered tonus of both systems, especially when the poisoning of the organism was progressing. The thyroid and suprarenals may be the chief endocrine glands involved. Though these tests cannot be used for remote prognosis, they contribute to show the actual state of the defense of the organism. Increased tonus of the sympathetic system seems to be favorable. Low tonus of the vegetative system is accompanied by an anergic state, and has the same bad significance.

Wound in the Heart.—Mondor found the wounded man suffocating, sitting on the bed bent forward, with arms stretched out in front of him, and told him to lie down gently. The pain increased, the external jugular vein became rigid and swelled to the size of an adult thumb, the venous dilatation extending to neck, face, arms and hands, while the pulse became weak and intermittent. When he again took a

sitting position the jugular veins returned to normal size, the cyanosis disappeared, and the pulse improved. Mondor diagnosed compression of the auricle from fluid in the pericardium, and the operation showed noncoagulated and nonencysted hemopericardium of from 200 to 300 c.c. The enormous distention and immediate subsidence of the jugular veins as the patient sat up or reclined were striking.

Complement Fixation in Tuberculosis.—Hanns, using Poulenc's tuberculin in tests for the ophthalmic reaction in fifty-five tuberculous subjects, obtained 61 per cent., and in twenty-six nontuberculous, 27 per cent. positive reactions. The results of his research enable him to affirm that complement fixation as it occurs in the tuberculous is a later phase of the usual phenomenon. It is the result of some still unknown phenomenon which may have no analogy with the Bordet-Wassermann reaction. This is the reason why the complement fixation reaction in tuberculosis is as yet of no value in diagnosis, but must be subjected to further research.

13: 353-372 (April 21) 1923

*Acid-Alkali Equilibrium and Acidosis. Desgrez and Bierry.—p. 353.
*Thermal Treatment in Diabetes. F. Rathery.—p. 355.
*Balneotherapy in Surgery of Bones. E. Sorrel.—p. 359.
*Technic and Indications of "Submarine" Shower. A. Piatot.—p. 365.
The Sea in Treatment of Tuberculosis. Baudouin.—p. 368.

Acid-Alkali Equilibrium and Acidosis.—Desgrez and Bierry determine the variations of the hydrogen ion concentration of the urine after ingestion of an alkaline mineral water (Vichy). They use it to prove acidotic conditions, and to find the "threshold dose" of the water necessary to lower the hydrogen ion concentration to about one third or one fourth of the initial value.

Thermal Treatment in Diabetes.—Rathery reviews different theories of the action of treatment of diabetes with mineral waters. He protests against the usual reports on amelioration of diabetes based exclusively on determination of the glycosuria without regard to diet. He criticizes the "ready-made" diets for diabetes in some thermal stations. Balneotherapy has advantages, but the patients should be selected and taught to keep up the regulation of the diet.

Indications for Balneotherapy and Climatotherapy in Surgery of Bones.—Sorrel recommends balneotherapy for traumatic lesions and conditions after infectious affections of joints, except tuberculosis. The patients with chronic lesions due to a general disease (including tuberculosis) are favorably influenced by climatotherapy. Yet it is absolutely necessary to choose only places where the patients can get the necessary medical and surgical care. Some striking results attributed to climatotherapy are due to a correct diagnosis of syphilis. Treatment should be instituted early.

Technic and Indications of "Submarine" Shower.—Piatot gives the history, technic and indications for a warm shower applied under the water of the bath-tub ("submarine"). Its action resembles that of massage. The method is used especially after acute polyarthritis, in spastic constipation, mucomembranous colitis, and gynecologic affections.

Presse Médicale, Paris

31: 461-472 (May 23) 1923

Treatment of Cancer of Uterine Cervix. J. L. Faure.—p. 461.
Interpretation of Radioscopic Findings in Certain Forms of Aortitis. M. Leconte.—p. 463.
The Drawbacks of Intraspinal Anesthesia. Desplas.—p. 467.

31: 517-528 (June 9) 1923

*Surgical Treatment of Angina Pectoris. T. Jonnesco.—p. 517.
Ionization Treatment of the Eye. Bourguignon et al.—p. 517.
*Clinical Gastrotonometry. R. Gaultier.—p. 520.
*Barbital in Treatment of Epilepsy. Maillard and Meignant.—p. 522.
*Intravenous Therapy. L. Cheinisse.—p. 525.

Surgical Treatment of Angina Pectoris.—Jonnesco relates that since 1896, he has resected the sympathetic nerve on both sides in 200 cases, usually including the first thoracic ganglion. The operation was done to relieve epilepsy, exophthalmic goiter, angina pectoris, migraine or for other indications. Reexamination from five to twenty-four years afterward has never revealed the slightest unfavorable influence on the heart from this total bilateral sympathectomy. The three angina pectoris patients were all cured by sympathectomy on one or both sides. Two epileptic girls were cured and are now the healthy mothers of six or seven children. Nothing like the serious disturbances elicited in animals by even partial resection of the cervical sympathetic was ever observed in his 200 clinical experiences. He mentions that the results realized recently by Coffey and Brown from even a partial unilateral sympathectomy in four of five cases of angina pectoris encourage further attempts in this line.

Clinical Gastrotonometry.—Gaultier gives an illustrated description of the two jars and connecting tubes with which the intragastric pressure and the capacity of the stomach are recorded. The stomach tube branches; one branch is connected with the manometer, the other with the jar into which water is slowly flowing from a higher jar and thus forcing a known quantity of air into the stomach. It thus aids in diagnosis, in prognosis, and in repeated estimation of the effects of treatment. It may even serve for treatment, using it for rhythmic inflation and deflation of the stomach to exercise the muscular walls.

Barbital in Treatment of Epilepsy.—Maillard and Meignant have had no serious mishaps during barbital treatment of more than 300 cases. The tolerance varies within a wide range, from 0.05 gm. to 1 gm. Even this drug fails at times. The great drawback is that the effectual dose is so close to the toxic dose. They add another instance of fatal poisoning from barbital in which 6 gm. of the drug had been taken with suicidal intent.

Intravenous Therapy.—Cheinisse comments approvingly on the report of the Council on Pharmacy and Chemistry in THE JOURNAL, May 5, 1923, and other recent articles on the limitations of intravenous medication.

31: 529-536 (June 13) 1923

Colitis of Transverse Colon. Faroy and Baumann.—p. 529.
*Treatment of Alveolar Pyorrhea. L. Monier.—p. 532.

Gingivectomy for Alveolar Pyorrhea.—Monier gives illustrations of a technic for resecting the entire outer edge of the gum in the radical treatment of pyorrhea. The incision in front and back of the teeth parallels the edge of the gum, and the resected portion forms a long strip with the row of tooth holes in the center. He says that any practitioner can do this simple operation, which cures inveterate pyorrhea at once. The only drawback is the appearance of the exposed roots of the teeth thereafter.

Revue de Chirurgie, Paris

61: 1-88, 1923

Isolated Fracture of the Humeral Condyle. Clavelin.—p. 1.
*Contusion of Pancreas and False Cysts. Mocquot and Costantini.—p. 21. Conc'n.
Circulation in Sigmoid and Rectum Region from Surgical Standpoint. E. Forgue and Milhaud.—p. 61.

Contusion of the Pancreas.—Mocquot and Costantini describe a case of complete rupture of the pancreas in a bicycle accident. The shock was intense and the youth died the twenty-fourth day; the escape of pancreatic juice had not been arrested by suture of the organ. In another case the man had been kicked in the abdomen by a horse, and conditions did not seem to demand an operation until the nineteenth day. Almost a liter of brownish pus was found in the traumatic pseudocyst. After marsupialization, conditions slowly returned to clinically normal. They compare with these cases fifty-five of contusion of the pancreas and eighty-eight of posttraumatic pseudocysts they have compiled, and discuss the differential signs, and complications. The article is to be continued. The interval between the trauma and the tumor revealing the false cyst ranged from twelve days to four years, but the average was from three weeks to three months.

61: 89-168, 1923

Emetin Treatment in Twenty-Two Cases of Amebic Abscess in Liver. G. L. Hartmann-Keppel.—p. 89.
*Diagnosis and Treatment of Fracture of Base of Skull. Ferry.—p. 117.
*Intracranial Subdural Hemorrhages in Adults. Wertheimer.—p. 150.

Fractures of Base of Skull.—The injury proved fatal within twenty hours in 9 of the 31 cases reported by Ferry, and 6 others died without regaining consciousness. The mortality in the 22 nonmoribund cases was thus 27.27 per cent. The others recovered under repeated lumbar puncture. Sub-

temporal trephining effectually supplemented the serial lumbar punctures in some of the cases in which the occipital foramen was blocked. But it was merely symptomatic, and not intended as a primary, preventive measure, in Cushing's sense.

Traumatic Subdural Hemorrhage in Adults.—Wertheimer describes the necropsy findings in two cases. They justify early and active intervention at the slightest signs of pressure on the brain. He does not think drainage is necessary; lumbar puncture at need answers the purpose. In short, he concludes, early trephining wards off secondary epilepsy.

61: 169-248, 1923

*Arthritis of Hip Joint. A. Broca and R. Massart.—p. 169.
Tuberculous Hygroma of Subdeltoid Bursa. Berard and Dunet.—p. 194.
Fracture of Condylar Region of Maxilla: Six Cases. Bercher.—p. 200.
*The Lymphatics of the Uterus. J. Leveuf and H. Godard.—p. 219.

Arthritis of the Hip Joint with Flattening and Fragmentation of the Head of the Femur.—Broca and Massart reject Waldenström's term "coxa plana" for this condition, as coxa refers to the ilium, not the head of the femur. They comment on the prevailing confusion, as unlike conditions are being grouped in this category. The only facts positively established to date are that the head of the femur may develop osteitis with a characteristic roentgen picture; that this process runs a mild course, without serious damage of the acetabulum, and that it generally subsides in time without leaving much trace. In some of the cases, the reossification of the head gives it a very special outline.

The Lymphatics of the Uterus.—Seven fine plates and twelve other illustrations show the arrangement of the lymphatics in the pelvis, each system being injected separately with a different colored fluid.

Revue Franç. de Gynécologie et d'Obstét., Paris

18: 209-256 (April 10) 1923

*Syncopal Condition in Obstetric Patients. A. Grosse.

Obstetric Syncopal Condition and Shock.—Grosse uses the term "obstetric shock" to denote a collapse, similar to that after serious accidents, or after rupture of the uterus, occurring in a patient after delivery without serious rupture or hemorrhage, and without previous lesions of lungs, heart, liver, or kidneys. The shock has been attributed to sudden decompression of the abdomen, to an inhibiting reflex starting in the uterus, to toxemia, or to cardiac collapse. Generally the prognosis is not unfavorable, notwithstanding the dramatic phenomena. Manual exploration of the vagina and uterus eliminates hemorrhage and placental retention, and shows that the uterine wall is intact, and that there is no important laceration of the genital tract. The patient should be kept warm and placed with head low, except in cyanosis, when the head should be raised. In case of atony of the abdominal walls, a tight abdominal bandage should be applied and heart and nerve stimulants should be administered. Oxygen facilitates the interchanges and hematosis, but blood transfusion may be indicated in desperate cases.

Schweizerische medizinische Wochenschrift, Basel

53: 509-528 (May 24) 1923

Blood Circulation at Altitude of 3,460 Meters. E. Lüscher.—p. 509.
*Comparative Tests of Thyroid Function. Pedotti and Branovacky.—p. 516.
Broncholithiasis. C. Leuw.—p. 519.
Heredity in Myopia. Jablonski.—p. 521. Comment. Vogt.—p. 522.
Value of Teaching Ancient Languages from the Standpoint of Psychology of Thinking. H. Sahli.—p. 522.

Comparative Examinations of Thyroid Function with Oxygen Consumption and the Examination of Blood in Asher's Experiment on Rats.—Pedotti and Branovacky injected serum from patients with affections of the thyroid gland into rats, and determined their tolerance to low air pressure. The results agreed with metabolism tests in 66 per cent. of the thirty-one cases, and conflicted with them only in 16 per cent.

Pediatria, Naples

31: 353-408 (April 1) 1923

*Cerebrospinal Fluid in Typhoid. L. Auricchio.—p. 353.
*Physical Development in Children with Infections. F. de Angelis.—p. 357.
Mechanism of Curative and Preventive Action of Extract of Autolyzed Leukocytes. A. Ronchi.—p. 366.
Surgical Treatment of Infantile Paralysis. N. Caprioli.—p. 382.

Research on Immune Bodies in Cerebrospinal Fluid in Typhoid.—Auricchio and Caronia, having frequently found typhoid bacilli in the cerebrospinal fluid of patients with typhoid but without meningeal changes, investigated the cerebrospinal fluid of these patients for immune bodies. Simultaneous tests of the cerebrospinal fluid and the blood serum of eleven such patients, with typhoid of more than ten days' standing, showed agglutination, complement fixation and absolute opsonic index in the peripheral blood, but none in the cerebrospinal fluid.

Physical Development in Relation to Hereditary Syphilis and Tuberculous Infections.—De Angelis examined 200 children in an orphan asylum, both by tuberculin and Wassermann reactions, and found that children infected with either syphilis or tuberculosis develop about as well as the unaffected, and that nearly half of the number, subject to both infections were superior to the average. Of the four groups of immune, syphilitic, tuberculous, and syphilitic tuberculous, children, respectively, 23, 22, 24 and 49 per cent. were above the average; 34, 38, 32 and 22 per cent. were average; and 43, 41, 45 and 30 per cent. were deficient in physical development. In regard to nutritive condition, the figures were respectively, 13, 5, 13 and 32 per cent. excellent; 46, 29, 32 and 27 per cent. good; 21, 44, 42 and 27 per cent. mediocre; and 13, 22, 13 and 14 per cent. deficient. Children with syphilitic and tuberculous infection—without manifestations of the disease—grow about as well as the normal, and those affected with both infections grow even better than normal. All organic functions are stimulated in the organism in its efforts at defense, and more rapid growth comes as a result of the increased stimulation, as long as the tissues and functions of the organs are intact. Defects in growth and nutritive condition are due to deficiency in surroundings and food. Children in well-to-do families grow notably taller than in poor families. The growth-arresting factors are not infections; these bring out latent energy in self defense, and, as a result, increased growth. The growth-arresting factors are external causes. The organism has power to overcome the internal situation, infinite adaptability, and by the immense resources at its disposal, it tends to draw a maximum advantage from all conditions.

Policlinico, Rome

30: 553-584 (April 30) 1923

*Rapid Differentiation of Diphtheria Bacilli. G. Pecori.—p. 553.
*Ether in Treatment of Acute Peritonitis. V. Caccini.—p. 558. Cont'd. Technic for Artificial Pneumothorax. Capuani.—p. 562. Idem. Pulvirenti.—p. 564.

Differentiation of Diphtheria Bacilli.—Pecori is chief of the department of the public health service that deals with prophylaxis of contagious diseases. His experience has been favorable with the Langer-Krüger method for differentiating diphtheria bacilli in dubious cases. It is based on the different behavior of true and false diphtheria bacilli in decolorization with alcohol after gram staining.

Ether in Treatment of Peritonitis.—Caccini reports the recovery of three patients with acute diffuse purulent peritonitis after intraperitoneal injection of ether through a puncture hole. A fourth patient, moribund when first seen, died. He injected from 30 to 40 c.c. of the ether, to a total of three to six injections. The peritonitis was of six to ten days' standing, and recovery was complete on the twenty-sixth to the forty-sixth day from the first symptoms. His experience teaches that it is best to begin with 10 or 15 c.c., and increase the amount, repeating the injection every twelfth or twenty-fourth hour.

30: 233-280 (May 15) 1923. Surgical Section

*Tuberculosis of the Tongue. G. Fantozzi.—p. 233.
*Complement Fixation in Tuberculosis. N. Piccaluga.—p. 257.
Suprasternal Dislocation of Clavicle. R. Redi.—p. 268.
Primary Tuberculous Ulcer of Upper Lip. R. Rinaldi.—p. 272.

Tuberculous Lesions of the Tongue.—Fantozzi has compiled 129 cases of this kind from the records. He gives an illustration of a woman, aged 52, permanently cured by his wedge resection of a primary tuberculous cold abscess in the tongue. It first attracted attention a month after injury of the zygoma

region by a fall on the floor of a consumptive's room. The lesion was resected two months later. Stropeni has reported a case with recovery under roentgen-ray treatment. Arc light treatment does not seem to have been applied. The prognosis depends on the existence of tuberculous lesions elsewhere. The ages ranged from 5 to 80 in his compilation; 10 of the patients were between 10 and 20, and 4 were younger children; 30 of the total 129 cases were in girls and women.

Complement Fixation in Tuberculosis.—Piccaluga compares the results of his own research in this line with what has been published in THE JOURNAL and elsewhere. He used the Besredka egg-bouillon antigen and tested 100 tuberculous subjects and large numbers of cases of malaria, cancer, acute infectious disease and others. A positive reaction was never obtained except in tuberculosis and syphilis, and only exceptionally in the latter. If syphilis can be excluded, the reaction can be regarded as a reliable sign of active tuberculosis.

Riforma Medica, Naples

39: 481-504 (May 21) 1923

Cholelithiasis from Surgical Standpoint. O. Uffreduzzi.—p. 481.
*Rouleau Formation of Erythrocytes. P. Mino.—p. 482.
*Glycosuria in Inherited Syphilis. G. Milani.—p. 485.
Sanatoriums in Malarial Zones. M. Gioseffi.—p. 489.
The Extrapyramidal Motor Syndromes. A. Jappelli.—p. 491.

Rouleau Formation of the Blood Cells.—Mino's research has confirmed that any upset in the normal chemical-physical balance of the blood plasm is liable to modify the physiologic tendency of the erythrocytes to pile up in rouleaux.

Glycosuria in Inherited Syphilis.—Milani's patient was a weakly girl, aged 14, with a family history of syphilis. She had recently developed diabetes after a period of chills and fever. The malaria had evidently upset the precarious balance of the endocrine glands and entailed the diabetes.

Amazonas Medico, Manáos

4: 1-172, 1922

Emergency Treatment of Grave Malaria. A. da Matta.—p. 11.
*Malarial Cerebellar Syndrome and Narcolepsy. A. da Matta.—p. 83.
*Autoserotherapy or Integral Serotherapy. E. Escomel.—p. 91.
Treatment of Rabies in Brazil. F. Vidal.—p. 122.
Sand-Flea Dermatophylosis. A. da Matta.—p. 126.
Phagedenic Ulcers of Toe-Nails. Idem.—p. 135.
Treatment of Mal de Caderas. L. E. Migone.—p. 138.
Grave Visceral Malaria. Soto Alfaro.—p. 148.
Fig-Tree Pest. A. da Matta.—p. 158.
Platypus Mattai Bréthes. N. Sp. J. Bréthes.—p. 160.
Eruption from Lepidoptera Insect Larvae. A. da Matta.—p. 167.

National Centennial Number.—This profusely illustrated special number is devoted mainly to biographical and historical reviews, but contains twelve articles on diseases and insect hosts common in northern Brazil.

Cerebellar Syndrome in Malaria.—The man presented narcolepsy in addition to the multiple and pronounced cerebellar symptoms, including incontinence of urine. All subsided under quinin as the hematozoa disappeared from the blood. No organisms were found at any time in the cerebrospinal fluid.

Integral Serotherapy.—Escomel recalls that the blood serum contains endocrine secretions, natural and acquired immunisins, and the substances formed in the reactions to other substances. Used in treatment, the serum, he says, is "always polyvalent, polytherapeutic, integral, personal and opportune." By heating the patient's own serum, the toxins destroyed by heat are eliminated, as also the pathogenic micro-organisms. The simple technic is described and the excellent effect of this integral autoserobacterial treatment is extolled. The effect is often striking, pyorrhea and acne subsiding with the acute rheumatism which had been the occasion for the autoserotherapy. He adds that it does not conflict with other therapeutic measures.

Archivos Españoles de Pediatría, Madrid

7: 129-192 (March) 1923

*Vertebral Tuberculosis in Children. J. Estella y Bermúdez de Castro. —p. 129.

Surgical Treatment of Vertebral Tuberculosis in Children.—Estella expatiates on the advantages of surgical rather than orthopedic treatment, and advocates Albee's method. He has applied it in a number of cases to date, and gives an illustrated description of the technic. Besides the mechanical support, the implant, he says, has a direct stimulating action on the biologic and chemical processes of repair. The chief indication for it is circumscribed Pott's disease in adolescents, while it is absolutely contraindicated in incipient cases in children, and in cases with septic lesons in the vicinity, or multiple foci at any age. In 112 cases at six different clinics, a complete cure was realized in 81.2 per cent., and 2.7 per cent. were improved. The immediate and absolute disappearance of the pain was constant with the Albee operation, but in his one case of paraplegia, the paralysis has persisted unmodified to date. To fit the implant to the spine, a green-stick fracture may be induced at need.

Prensa Médica Argentina, Buenos Aires

9: 957-980 (April 30) 1923

*Gonorrhea. M. V. Carbonell and Germinal Rodríguez.—p. 957.
*Palpation of Pylorus. C. Bonorino Udaondo.—p. 962.
Treatment of Fracture Below the Knee. R. Finochietto.—p. 966.

Prophylaxis of Gonorrhea.—The epithelial cells, gonococci, diplococci and leukocytes in the urethral secretion in gonorrhea increase and decrease proportionally to the stage and prognosis of the case. As recovery advances, the gonococci grow less numerous and disappear. Next the associated micro-organisms disappear; then the leukocytes, and finally the epithelial cells. In chronic cases the secretion may have to be provoked, but the microscope will show to which one of the seven phase groups the case belongs at the moment. Gonococci are found only in the first three groups; in the next to the last group, epithelial cells are numerous, as well as polymorphonuclears, but in the last stage before complete recovery, the microscope shows only numerous epithelial cells. A number of photomicrograms showing the seven groups are reproduced.

Palpation of Normal Pylorus.—Bonorino Udaondo was able to palpate the normal pylorus in 9.5 per cent. of 200 persons examined during digestion. He emphasizes the extreme variability in the findings, even in the same case, and warns against mistaking the normal play of the pylorus for pathologic conditions.

Repertorio de Medicina y Cirugía, Bogota

14: 167-206 (Feb.) 1923

*Gastric Cancer. J. B. Montoya y Florez.—p. 169.
*Campaign Against Hookworm in Colombia. W. M. Monroe.—p. 183.
Ovarian Cyst Weighing 155 Pounds. A. Lee M.—p. 188.
*Casts for Radium Applicators. A. Esguerra, O. Monod and G. Richard. —p. 192.

Surgical Treatment of Gastric Cancer.—Montoya of Bogota, recalling the suffering and mortality from gastric cancer asserts that in reporting operations on the stomach for cancer, the report should read, not "60 per cent. mortality" but "40 per cent. saved." He adds that this inversion of terms would influence not only the public but the profession itself, as physicians would be encouraged to advise operation, and at an earlier period, instead of shrinking from advising an "operation that has a death rate of 60 per cent." He has applied Cardenal's method in thirty-seven cases, with the cure of all the thirty-one ulcer patients and two of the three patients with cancer.

The Hookworm Campaign in Colombia.—Monroe describes the work accomplished in 1922. Of the 72,597 persons examined for the first time, 67,755 were found infested, and 28,077 continued treatment till cured. This is the largest number of cures recorded in any Latin-American country. More than 50,000 took two or more treatments, which is almost equivalent to a cure. The total number of treatments given during the year was 169,326. In 12,547, four treatments were given; in 5,695, five; in 2,170, six; in 880, seven; in 350, eight; in 121, nine, and in 87, ten. The public, the clergy and the press aided the work so effectually that appeals are being constantly received for establishment of new laboratories. The building of latrines meets with considerable opposition, the principal objection being that they increase the number of mosquitoes. The government appropriated $50,000 for the work. The proportion contributed by the Rockefeller Foundation is to become progressively less in time.

Casts to Hold Radium Applicators in Immovable Contact with Lesion.—The advantages of these casts and the technic for making the "Colombia paste" for them have already been described in THE JOURNAL, Sept. 30, 1922, p. 1180.

Semana Médica, Buenos Aires

1: 781-832 (April 26) 1923

*Access to Glands in Neck. C. M. Squirru.—p. 781.
Chemotherapy of Cancer. R. Bullrich and Rabuffetti.—p. 786.
The Recent Research on Rickets. C. Lagos García.—p. 789.
*Significance of Nocturnal Gallstone Colic. F. A. Gallino.—p. 804.
Experiences with the Inflatable Bag in Obstetrics. J. E. Bazán.—p. 811.
Plasmogenesis in 1922. A. L. Herrera.—p. 815.

Extirpation of Glands in the Neck.—Squirru's sixteen illustrations show the advantage and drawbacks of various technics for a radical operation on the glands in the neck in removing a cancer in the mouth. The access by his own method seems to be most convenient and ample. He begins with the Sebilleau but supplements it with another incision, curving away from the first where it crosses the anterior margin of the sternocleidomastoid, and extending down to the anterior margin of the trapezius. He removes the cancer and the glands on one side, completing the operation on the other side a week or two later. Not until after this does he apply radium or roentgen rays. The operation is done with the table at an angle of almost 45 degrees to reduce the congestion in the neck. His ample incision often revealed glands already involved when nothing had suggested their invasion.

Nocturnal Colic with Gallstones.—Gallino says that in sixty-six of eighty cases of gallstone colic, the pains came on in the night, and he ascribes great differential value to this nocturnal tendency. In sleep, certain inhibiting influences are suspended, and the horizontal position may facilitate shifting of the calculi.

Siglo Médico, Madrid

71: 381-404 (April 21) 1923

Tribute to Jenner. G. Pittaluga.—p. 381.
Biochemistry in Medicine. J. Caballero y Fernández.—p. 383.
Bismuth in Treatment of Syphilis. Barrio de Medina.—p. 387.
The Use of Proprietaries by Physicians. Piñerúa.—p. 388.
Hookworm in Spanish Mines. Sánchez Martín.—p. 390. Conc'n p. 453.

Archiv für klinische Chirurgie, Berlin

124: 387-564 (May 26) 1923

*Fracture of the Pelvis. V. Orator.—p. 387.
*Histology of Intestinal Suture. M. Gara and F. Mandl.—p. 419.
Axillary Artery from Surgical Standpoint. Gesselevitsch.—p. 435.
Vessels in Air Passages and Lungs from Surgical Standpoint. A. Melnikoff.—p. 460.
*Köhler's Disease and Coxa Plana. G. Axhausen.—p. 511.
*Experimental Joint Implants. G. Axhausen.—p. 543.
Acute Vertebral Osteomyelitis. K. Wohlgemuth.—p. 554.
*Gastric Mucosa After Gastro-Enterostomy. Oshikawa.—p. 559.

Fracture of the Pelvis.—Orator found that the fracture had healed in thirty-nine out of sixty-one cases of fracture of the pelvis in the last twenty years in Eiselsberg's service. The healing was often complete restitution in the young, but the prognosis in the elderly is bad. When the acetabulum was fractured, only 50 per cent. were left without crippling, and only 25 or 30 per cent. after Malgaigne's fracture, or fracture of the posterior ring.

Plastic Covering for Suture of the Intestine.—Gara and Mandl report histologic confirmation of the advantages of turning back, like a cuff, the serosa on the bowel that is being resected. The stumps are then sutured end-to-end, and the cuff is turned back over the suture, and sutured to cover the line of stitches.

Nature of Köhler's Disease and of Coxa Plana.—Axhausen presents evidence that incriminates the vascular system in the causation of these two affections. He has traced the course under roentgen-ray control, and found it the same in each. Both are the consequences of some primary interruption in the nourishment of the epiphysis, probably from obstruction of some vessel by an embolus. The microorganisms involved are not virulent, or they are conquered by the defensive forces, and the epiphysis presents merely a bland embolic total necrosis. Both affections belong in the category of bone arthritis deformans. If the affection is recognized in time, and the part relieved from weight-bearing, the dead epiphysis will not be forced out of shape. Otherwise the head of the bone gets flattened, and the regenerative process develops along the same lines.

Experimental Research on Joints.—Axhausen cut wedges from joints and reimplanted them, seeking for light on Köhler's disease. The findings all sustain his views summarized in the preceding abstract.

The Gastric Mucosa in Dogs After Gastro-Enterostomy.—Oshikawa discusses in particular the Bizzozero spirochetes.

Deutsche medizinische Wochenschrift, Berlin

49: 633-666 (May 18) 1923

Experimental Tar Tumors. Hoffmann et al.—p. 633.
*Desensitization in Hay-Fever. C. Prausnitz.—p. 634.
*Contagious and Noncontagious Tuberculosis. Braeuning.—p. 635.
*Diagnosis of Open Pulmonary Tuberculosis. Wankel.—p. 637.
Calcium Content of Human Serum. Herzfeld and Lubowsky.—p. 638. Conc'n.
*Hemoclasis and Colloidoclasis. Adelsberger and Rosenberg.—p. 639.
*Bilirubin in Human Serum. G. Lepehne.—p. 641.
*Diagnosis and Treatment of Nephritis in Children. Mendel.—p. 643.
Preventive and Curative Serotherapy of Dysentery. Kuhle.—p. 645.
Outdoor and Sun Treatment for Children. I. Rosenstern.—p. 646.
Dermatological Diagnosis. M. Joseph.—p. 648. Conc'n.
*Removing Warts. L. Blendermann.—p. 650.
Surgical Treatment of Dilatation of Vesical End of Ureter. A. Rothschild.—p. 650.
Physicians of Jails. Friedrich.—p. 651.

Desensitization in Hay-Fever.—Prausnitz found that the serum of patients who were treated with pollen extracts acquired the faculty of neutralizing, to a certain extent, the toxic effect of pollens.

Differentiation Between Contagious and Noncontagious Pulmonary Tuberculosis.—Braeuning finds that some patients with active tuberculous affections of the lungs have no bacilli in the sputum. The only distinct difference between open and closed tuberculosis is in the presence of bacilli in the sputum. Clinical signs are not decisive.

Inoculation of Guinea-Pigs with Sputum in Diagnosis of Open Pulmonary Tuberculosis.—Wankel found with the experiment on animals more than one third more open tuberculous affections than with other methods. Yet even this method was negative in almost two thirds of the tuberculous patients who produced sputum.

Hemoclasis and Colloidoclasis.—Adelsberger and Rosenberg consider the increased speed of sedimentation after ingestion of milk more instructive than the leukopenia. The test gave very good results in insufficiency of the liver, while alimentary leukopenia depends to a large extent on the vegetative nervous system.

Clinical Significance of Bilirubin Determination in Human Serum.—Lepehne recommends a modification of van den Bergh's test for general practice. He does not believe that the direct reaction depends only on the concentration of bile.

Diagnosis and Treatment of Nephritis in Children.—Mendel points out the necessity of examination of urine in infants. A simple lack of increase in weight may be due to nephritis. Not every infant with much albumin and casts has nephritis. Presence of erythrocytes is more important. The affection of the kidneys during diphtheria is an excellent gage of the severity of the disease, and guide to specific treatment. He follows Volhard in the classification of kidney diseases, and differs from him only in substituting the hunger and thirst treatment in diffuse nephritis by giving 250-300 gm. of sugar (preferably milk sugar) in 500-750 c.c. of water as the exclusive diet for two to four days. Degenerative affections of kidneys with edemas, very high specific gravity of urine and good elimination of urea are favorably influenced by thyroid preparations and large amounts of urea (at least 20 gm. daily). Digitalis, if necessary, should be given in large doses. Determination of blood pressure is very valuable in diagnosis after the child gets accustomed to it. The children have to be observed for years after the nephritis.

Removing Warts.—Blendermann disinfects the wart with tincture of iodin, freezes it with ethyl chlorid, and removes it with a sharp curet. The method is painless and the scar insignificant.

Deutsche Zeitschrift für Chirurgie, Leipzig

178: 145-288 (March 30) 1923

*Etiology of Köhler's Disease. O. Schreuder.—p. 145.
Vessels of Parenchymatous Organs from Surgical Standpoint. A. Melnikoff.—p. 160.
Experiences with Friedmann's Remedy. B. Hein.—p. 172.
*The Blood Pressure During Operations. E. König.—p. 187.
*Torsion of Internal Organs. B. Tenckhoff.—p. 224.
*Volvulus of the Cecum. H. Beeger.—p. 240.
*Blood Pressure in Local and Regional Anesthesia. O. Wiemann.—p. 268.

Etiology of Köhler's Disease. — Schreuder argues that chronic trauma is responsible for the affection of the second metatarsal bone to which Köhler called attention in 1915. In two of the twenty-four cases on record it was bilateral; fifteen of the patients were girls between 10 and 21. Rest is the main thing in treatment, with suitable shoes.

Blood Pressure During Operations. — König recorded the blood pressure before, during and after operations, and found that in several hundred cases, with both chloroform and ether, the blood pressure dropped in proportion to the depth of the general anesthesia. Intraspinal anesthesia reduces the pressure likewise, but an ordinary operation, in itself, has little effect on the pressure. The excitement and fear before the operation raise the pressure, and this rise accompanies local anesthesia, from the same psychic causes. Continuous control of the blood pressure during the operation allows instructive oversight of the patient's condition, as every serious mishap is preceded by a warning, rapid fall of the pressure.

Mechanism of Torsion of Internal Organs. — Tenckhoff theorizes that the slight twisting of the trunk, at each step in walking, is enough to induce torsion of a pedicle in time. A wisp of omentum and an inguinal hernia became twisted in two cases reported.

Volvulus of the Cecum.—Beeger states that the volvulus was complete in 42 per cent. of the 69 operative cases he has found on record. In 3 cases personally observed, the disturbances from the volvulus were the first symptoms indicating obstruction of the passage. Over 53 per cent. terminated fatally, 26 dying in collapse and 9 from peritonitis. Two patients died although the interval was only six and eight hours, and 5 recovered with a delay of two weeks before the operation.

Blood Pressure During Local and Regional Anesthesia.—Wiemann ascribes to difficulty of absorption of the anesthetic, injected for a hernia, the slight influence on blood pressure during hernia operations under local anesthesia. Conditions are entirely different with goiter operations; both blood pressure and pulse show extreme variations. In the majority, a difference of 41 to 80 mm. in the pressure was recorded, and in some it reached 100 and 120. The drop in pressure was even more pronounced with paravertebral anesthesia, especially in the neck region. Such an intense upset in the circulation explains many mishaps at operations. It teaches the necessity for waiting for the circulation to regain its balance to some extent before beginning the operation.

Klinische Wochenschrift, Berlin

2: 909-956 (May 14) 1923

*Invisible Infectious Substances. R. Doerr.—p. 909.
*Serum Modifies Action of Tuberculin. Jadassohn.—p. 913.
*Respiratory Tetany. Behrendt and Freudenberg.—p. 919. Conc'n.
*Periarterial Sympathectomy in Arteriosclerotic Gangrene. F. Brüning.—p. 923.
*Alimentary Stimulation-Hyperglycemia in Diabetes. Rosenberg.—p. 925.
*Phlorizin Glycosuria in Liver Diseases. Bauer and Kerti.—p. 927.
Treatment of Vulvovaginitis of Small Girls. J. Müller.—p. 928.
Steeple Skull and Fragile Erythrocytes. Barkan.—p. 929.
Urea Determination with Urease. H. Deist.—p. 930.
"Nature of Bacteriophagia." K. Hajós.—p. 931.
*New Function of the Thyroid. B. Stuber.—p. 931.
Mechanism of Bilirubin Reaction in Blood. Adler and Strauss.—p. 932.
Treatment with Artificial Light in Dermatology. Halberstädter.—p. 933.
Importance of Private Hospitals for the Public Health and Their Present Plight. Schaeffer.—p. 934.
Significance of Physical Chemistry in Bacteriology. E. Putter.—p. 936. Conc'n.

Invisible Infectious Substances and Their Relation to Problems of General Biology.—Doerr points out that the unlimited passage of an infectious agent is not in itself absolute proof that the agent is living, especially as long as we connect living matter with ideas of a definite structure without admitting the possibility of the occurrence of a dissolved phase. A passage through animals cannot be compared with repeated inoculations in dead mediums. As in the Twort-d'Herelle phenomenon, bacteriophagia, the problem of animal passage is complicated by the presence of other living elements on which the substance acts. The evaluation of passage through animals as a proof of living virus must be reduced to the limits of logic. Yet even in dead matter, continued passage is not a proof of a living agent: Delezenne and Ledebt were able to activate thirty passages of trypsinogen by one amount of enterokinase added to the first solution. The real question in d'Herelle's phenomenon is whether the agent is corpuscular, or in colloidal solution.

Enhancement and Enfeebling of Action of Tuberculin with Serum.—Jadassohn found that a mixture of human serum and tuberculin causes a stronger intracutaneous reaction if it stands for some time at room temperature. The action is not changed by heating the mixture to 58 C. If the mixture is injected immediately, the action is weaker than that of tuberculin alone.

Points of Action of Stimuli Inducing Clinical Tetany by Forced Respiration.—Behrendt and Freudenberg noted spasms in tetany even after application of procain to the nerves. They believe that the spasms depend on the blood changes which act on the intermediary neuromuscular substance. They assume a double innervation, and believe that procain left one intact. These impulses are probably parasympathetic.

Permanent Results and Failures of Periarterial Sympathectomy, and Its Technic in Arteriosclerotic Gangrene.—Brüning gives some technical points, and recommends the operation not only in trophic and vasomotor disturbances, but also in beginning gangrene. In this case, however, the spasm of the artery, which persists after the operation for some time, may cause a more rapid appearance of the gangrene as was demonstrated in one case. Yet on the fifth day the clinical picture changed, and the patient recovered.

Alimentary Stimulation-Hyperglycemia in Diabetes. — Rosenberg found that ingestion of 100 gm. of boiled meat provoked in severe cases of diabetes a hyperglycemia which was stronger than in light cases. In mild cases it sometimes did not appear at all. The action may be as strong as that of a corresponding quantity of carbohydrates. He believes that it is caused by a specific stimulation of the liver. Persons without diabetes, especially neurotics under emotional strain, may show the same symptom.

Phlorizin Glycosuria in Liver Diseases.—Bauer and Kerti found in affections of the liver a strong and prolonged glycosuria after intramuscular injections of 0.02 phlorizin. Normal persons excreted usually between 2 to 4 gm. (maximal 6 gm. in two to four hours). Patients suffering from exophthalmic goiter had an excretion of maximally 8 to 9 gm. in six to eight hours. A patient with cirrhosis of the liver excreted over 26 gm. in twenty-four hours. The extreme lowering of the blood sugar, without marked glycosuria, in one case leads them to the theory of the passage of glucose into the tissues, a tissue diabetes.

A New Function of the Thyroid, and the Biologic Significance of Iodin.—Stuber found that a thyroidectomized rabbit is unable to synthesize guanidin-acetic acid with methyl to creatin. Feeding of thyroid or inorganic iodin restored this faculty. He points out that iodin is a favorite means of introducing alkyls into organic compounds in chemistry.

Medizinische Klinik, Berlin

19: 671-708 (May 20) 1923

*Surgery of Vegetative Nervous System. F. Brüning.—p. 671.
So-Called Sexual Anesthesia of Women. A. Moll.—p. 675.
Etiology and Recurrence of Exophthalmic Goiter. F. Deutsch.—p. 678.
Lymphosarcomatosis of Gastro-Intestinal Tract. F. Zimmer.—p. 681.
Treatment of Sequelae of Epidemic Encephalitis. F. Bardachzi.—p. 683.
Hygienic Jars for Sputum in Hospitals. E. Stark.—p. 688.
Complement Fixation in Tuberculosis. Kwasniewski and Ciric.—p. 688.
Prolapse of Vagina and Uterus. E. Runge.—p. 691.
Principles for Classification of Nutritional Disturbances of Infants. Rietschel.—p. 693.
Inflammatory and Itching Affections of Skin. F. Pinkus.—p. 694.

Surgery of Vegetative Nervous System.—Brüning deals especially with the theory of indications for and results of

periarterial sympathectomy. Extirpation of the cervical sympathetic in epilepsy, glaucoma, and exophthalmic goiter had no good results. In angiospastic conditions however, especially in angina pectoris, the operation is indicated.

Monatsschrift für Geb. und Gynäkologie, Berlin

62: 1-118 (Feb.) 1923

Superfetation. M. Hofmeier.—p. 1.
Influence of Drugs on Capillary Circulation. F. Grzechowiak.—p. 7.
Use of Retroplacental and Umbilical Vein Blood in Diagnosis of Syphilis. F. Klee and E. Hofmann.—p. 21.
*Influence of Pregnancy on Blood Pressure. Hinselmann.—p. 37.
*Principles for Treatment of Eclampsia. Id.—p. 41.
Lymph-Cystic Ovary. R. Fleischer.—p. 45.
Spontaneous Version or Spontaneous Delivery of Fetus? Fleischer.—p. 50.
*Fate of Children with Hydramnion. M. Floris.—p. 55.
Lobelin in Asphyxia Neonatorum. T. v. Miltner.—p. 60.
Justification for Embryotomy Intra Partum. Enzinger.—p. 69.
Regulation of Midwifery. N. Ellerbroek.—p. 79.
Ovarian Endometrioma. O. Frankl.—p. 93.
*Suggestion to Medical Writers. K. Heil.—p. 95.

Influence of Pregnancy on Blood Pressure.—Hinselmann has established that the total volume of blood is increased in the pregnant, but that the pressure tends to drop rather than rise, as the terminal arterial vessels are dilated. This insures the needed extra supply of blood to the tissues. When the pregnancy is proving too much of a strain, the terminal dilation is arrested, and vasoconstriction may be detected in the capillary circulation before any other symptoms attract attention. He thinks this is a sign that the vascular system of *this* patient in *this* pregnancy is functionally insufficient. This assumption removes eclampsia and pregnancy kidney from the toxicoses, and ranks them as overstrain of the vascular system.

Treatment of Eclampsia.—Hinselmann's conception of eclampsia as an overstrain of the vascular system, explains the benefit from repose, venesection and immediate cesarean section. But the vascular insufficiency invites infection, and two of the twelve women thus treated died from peritonitis. He urges that the task now is to find some means of reducing the blood pressure by acting on the central nervous system—some cerebral vasodilating influence—as the last link in the chain of this conception of eclampsia.

Fate of Hydramnion Children.—Floris has traced to date sixty-five of 236 children born with hydramnion. Only 14 per cent. are known to have died. The physical and mental development of the others has been excellent, averaging well with other children.

Suggestion to Medical Writers.—Heil suggests that the author of a monograph should present to some central library with a reprint of his article all the manuscript tables, bibliography, and other data which were crowded out of his published work from lack of space or on account of the expense or for other reason. The monograph should mention the special library in view.

Münchener medizinische Wochenschrift, Munich

70: 619-658 (May 18) 1923

"Moleculardisperse" Silver Solution in Gonorrhea. L. v. Zumbusch.—p. 619.
*Chance of Cure in Syphilis. Hoffmann and Hofmann.—p. 620.
*Development of Epidermis. W. Frieboes.—p. 622.
*Arsphenamin in Experimental Syphilis. Plaut and Mulzer.—p. 623.
Bismuth Treatment of Syphilis. Müller et al.—p. 625.
*Bismuth in Syphilis. H. Felke.—p. 627.
*Action of Temperature on Spirochaeta Pallida. Krantz.—p. 628.
Transmission of Congenital Syphilis. F. Salomon.—p. 630.
*Treatment of Syphilis. O. Salomon.—p. 631.
"Green Benzaldehyd Reaction" as Simple Test for Noncoagulable Nitrogen in Blood. G. Burghardt.—p. 632.
*Tests for Syphilis During Pregnancy. Georgi and Handorn.—p. 632.
Famine and Epidemics in Russia. Abel.—p. 633.
Perforating Ulcer of Foot After Shot Through Nerve. Schaeffer.—p. 637.
*Method for Testing Knee-Jerk. J. Plesch.—p. 637.
Malaria and Its Abortive Treatment. G. Baermann.—p. 637. Conc'n.
Skin Diseases Due to Animal Parasites. L. v. Zumbusch.—p. 640.
*Abolition of Brothels or Reglementation? F. Schwink.—p. 641.

Early Chance of Cure in Acquired and Congenital Syphilis.—Hoffmann and Hofmann emphasize the advantages of intensive early treatment of syphilis. The appearance of a positive Wassermann reaction in the blood and even a secondary eruption do not indicate that it is too late to try energetic instead of prolonged intermittent treatment. Large amounts of arsphenamin should be injected at short intervals and combined with mercury or bismuth treatment. The interval between the first two series should not exceed five to six weeks.

Structure and Development of Human and Animal Epidermis: Structure of Epithelium of Cornea.—Frieboes believes that the epidermis is an organ derived not only from the ectoderm, but also from the mesoderm. The latter is represented by a system of fibers which are important in the metabolism of water and in immunity. The cornea contains similar structures.

Action of Insufficient Arsphenamin Treatment on Experimental Syphilis of Rabbits.—Plaut and Mulzer injected syphilitic rabbits with insufficient doses of arsphenamin. They found that inoculation of the surviving spirochetes from the rabbits caused an earlier appearance of the affection in the inoculated animals. They found, also, changes in the cerebrospinal fluid, and severe general eruptions, while the control experiments with the same untreated strain caused only mild infections. No arsphenamin is better than insufficient doses.

Action, Untoward Effects and Dosage of Bismuth in Treatment of Syphilis.—Felke found in the third or fourth week of bismuth treatment many epithelial kidney cells in the urine, which acquires even macroscopically a peculiar opalescence. Albumin is not always present. This injury can be avoided by keeping the amount of bismuth injected in six weeks under 0.8 gm. The action of this amount on the clinical symptoms is good, though the Wassermann reaction becomes negative only in one third of such cases at the end of the treatment. Mercury should be substituted by bismuth in the treatment of early syphilis, and the drug should be used to supplement arsphenamin and mercury in the chronic treatment.

Action of Low Temperatures on Cultures of Spirochetes.—Krantz found that cultures of *Spirochaeta pallida* grow at room temperature. Keeping the cultures for 101 hours in the ice box (temperature between 0 and 5 C. did not destroy them. A freezing mixture of minus 20 C. could act on the cultures for an hour without any apparent injurious effect.

Treatment of Syphilis.—Salomon recommends the use of thermocoagulation of the primary chancre, besides the general treatment.

Reliability of Serologic Tests for Syphilis During Pregnancy and Postpartum.—Georgi and Handorn find the serologic tests in pregnancy and during and after delivery reliable.

Method for Testing Knee-Jerk.—Plesch recommends compressing the lowest part of the patella and the tendon of the quadriceps between the thumb and index, or squeezing a fold in the skin over the patella while testing the reflex. The method works even if Jendrassik's method fails.

Abolition or Regulation of Brothels?—Schwink publishes the unanimous resolution of the health council of Nuremberg against the impending abolition of brothels. The chief reason for this opinion is the expected increase in venereal diseases. He brings statistical data to demonstrate the relatively rare infections in brothels. Only 2.22 per cent. of these prostitutes were found infected against 32 per cent. of uncontrolled girls captured in raids.

Zeitschrift für Geburtshülfe und Gynäk., Stuttgart

86: 1-220 (May 8) 1923

*Roofing Over Gynecologic Focus with Peritoneum. Beuttner.—p. 1.
Rare Form of Ovarian Cancer. R. Zimmermann.—p. 19.
*Female Genitals in Lymphatic Leukemia. O. Brakemann.—p. 23.
*Operative Treatment of Uterine Myoma. H. H. Schmid.—p. 36.
Changes in Ovaries During Pregnancy. K. M. Walthard.—p. 74.
*Syphilis and Pregnancy. E. Klaften and W. Kalman.—p. 123.
Favorable Experiences with Kielland Forceps. v. Schubert.—p. 134.

Peritoneum to Roof Over Focus After Gynecologic Operations.—Beuttner gives the detailed history of ten cases of complicated adnexitis or uterine lesions in which he utilized the peritoneum to roof over the focus. The aim of the article is to establish the general principles for this "peritonization," to imitate Nature most closely.

Changes in Genitals in Lymphatic Leukemia.—The disease ran its fatal course in less than four months in the nullipara, aged 31. Leukemic infiltrations were found in the genital organs as elsewhere.

Conservative Myoma Operations.—Schmid reports recurrence of the myoma in 7 per cent. of his fifty-seven patients traced to date after conservative operations. The general mortality of conservative operations has dropped in the last decade to 1 or 2 per cent. and of radical operations to 2 or 5 per cent. The duration and severity of the hemorrhages were reduced in two thirds of the cases after conservative treatment, and the ultimate subjective condition and earning capacity were as good after this as after radical measures. Enucleation of the myoma is followed by pregnancy in 38 or 40 per cent. of the cases in women under 35, and serious complications of childbirth later are extremely rare.

Syphilis and Pregnancy.—At the Vienna maternity in charge of Peham, the Wassermann test applied to 5,738 parturients in a recent eighteen months revealed latent syphilis in 96 cases. The Wassermann reaction often veered transiently to negative during the puerperium. Infarcts in the placenta were evident in 25 cases in this syphilitic group, and anomalies were common. In 26 cases, the women bore repeatedly nonviable children although there was nothing except the positive Wassermann to suggest syphilis, and no history of contagion. The necessity for resumption of treatment at every pregnancy is emphasized.

Zentralblatt für innere Medizin, Leipzig

44: 337-352 (May 26) 1923

*Capillary Circulation and Sedimentation of Erythrocytes. Kürten and Gabriel.—p. 337.

The Capillary Circulation in Relation to Speed of Sedimentation of Erythrocytes.—Kürten and Gabriel find no parallelism between a directly observed capillary blood stream in "granules" and the sedimentation speed of erythrocytes. This peculiarity of the blood stream is local, and may be produced together with a broadening of capillaries by irradiation.

Casopis lekaruv ceskych, Prague

62: 193-220 (Feb. 24) 1923

*Predilection of Eye for Tuberculosis. J. Deyl.—p. 193. Conc'n, p. 226.
Plastic Reconstruction of Vagina with Total Defect. J. Trapl.—p. 197.
Treatment of Abortion. O. Saitz.—p. 202.

Causes of Predilection of Some Parts of the Eye for Tuberculosis.—Deyl points out that tuberculosis of the eye occurs most frequently in the anterior parts of the eye (episclera, iris, ciliary body). In the posterior part it affects almost exclusively the choroid, comparatively rarely the retina or optic nerve. It is a peculiar fact that it may affect only the iris and the ciliary body without localization in the choroid. It hardly ever occurs in the striated muscles of the eye, the orbital fat, tarsus, vitreous body, lens or cornea, except by extension from other parts. The anterior points of predilection are supplied by at least two arteries, which form very dense capillaries. The different streams clash and cause at times a slowing down of the blood stream. This, in bacillemia, leads to an easier localization of bacilli. Similar anatomic conditions of the vessels and broadening of the capillaries are responsible for the other peculiarities.

Gann, Tokio

16: 1-78 (Feb.) 1923. English and German Edition

Antibody Against Mouse Carcinoma. Yamagiwa and Kimura.—p. 1.
Fibroplastic Myxoma in a Goldfish. H. Wago.—p. 11.
Spindle-Cell Sarcoma in a Salmon. Y. Kazama.—p. 12.
*Tumor Formation in Internal Organs. Id.—p. 14.
Effects of Chloroform on Growth of Transplanted Tumors. T. Kimura, K. Ohba and Y. Wada.—p. 19.
Sarcoma in Transplanted Mouse Cancer. T. Asada.—p. 22.
Effects of Wool Fat Feeding on Transplanted Chicken Chondroma. N. Akamatsu.—p. 30.
Primary Hepatic Carcinoma in Child. M. Takaidzumi.—p. 31.
*Tumor Substance in Treatment of Mouse Cancer. M. Takahashi.—p. 33.
*Influence of Gonads on Growth of Mouse Cancer. T. Asada.—p. 35.
Cancer Metastases in Organs of Circulation. K. Eguchi.—p. 44.
Case of Carcinosis of Spleen. I. Honda.—p. 50.
Tumors in Jaws of Horses. T. Kimura and S. Taguma.—p. 51.
Metastasis of Chicken Sarcoma. K. Tadenuma.—p. 55.
Metastasis of Mouse Carcinoma. Okonogi and Tadenuma.—p. 60.

Cancer Research in Japan.—This issue of *Gann* is accompanied with six fine plates illustrating the articles by Yamagiwa, Kazama, Asada, Eguchi, Honda and Kimura. It also contains the general index for the entire sixteen volumes of the quarterly, which is issued by the Japanese Society of Cancer Research. Pathologic Institute, Imperial University, Tokio, Japan.

Experimental Tumors in Internal Organs.—Kazama used mechanical irritants, as well as chemical and combined chemical and mechanical irritants, in his numerous extensive experiments on dogs, rabbits, guinea-pigs, fowls and pigeons. The results confirm those of others in this line: In the stomach and bladder of rabbits and in the stomach and gallbladder of guinea-pigs, the irritants mixed with the food or applied locally resulted in producing not only atypical proliferation of epithelium, but tumor-like proliferation or actual cancer. In the majority, the new growth was single, and at the point of greatest irritation. There was metastasis in six of the eighteen cases of adenocarcinoma of the gallbladder in guinea-pigs. Clinical experiences with cancer in gallbladders containing gallstones were repeated in the animals in which a tumor developed after a particle of stone had been introduced into the gallbladder.

Treatment of Mouse Cancer with Cancer Tissue.—Takahashi states that the autolysate of two strains of transplantable mouse cancer displayed an inhibiting action when injected into animals developing the same kind of tumor. Or possibly the inhibiting effect was due to a kind of induced immunity. A similar inhibitory effect followed implantation of a heated fragment of the cancer tissue.

Influence of Sex Glands on Growth of Transplantable Mouse Tumor.—Asada concludes that the internal secretion of the sex glands evidently has some inhibiting influence on the growth of transplantable mouse tumors, as there is a larger proportion of "takes" and they grow faster after castration. This phenomenon is more pronounced in females than in males, and it occurs only when the inoculation is made after puberty. The virulence of malignant disease is at its highest in spring and summer, and the transplanted tumor shows a more active growth the briefer the interval between the castration and the inoculation.

Mitteilungen a. d. medizinischen Fakultät, Tokio

29: 237-420 (Sept. 25) 1922. German Edition

Inhibitory Action of Vagus on Heart Movements. K. Omori.—p. 237.
Virulence for Rabbits of Fixed Virus of Rabies. Imamura and Satoh.—p. 307.
Influence of Fat on Assimilation of Sugar. Sakaguchi et al.—p. 321.
Cultivation of Rabies Virus in Vitro. A. Imamura.—p. 347.
Research on Human Gastric Juice. V. Itakura.—p. 379.
Formation and Resorption of Cerebrospinal Fluid. Kumagai.—p. 389.

Mededeelingen v. d. Burg. Geneesk. Dienst, Batavia

1-136, 1923. English Edition

Need of Antiberiberi Vitamin and Amount of This Vitamin in Different Foods. B. C. P. Jansen.—p. 1.
*Nutrient Value of Old Rice. B. C. P. Jansen.—p. 123.

Nutrient Value of Rice One Hundred Years Old.—Jansen explains that the surplus rice harvested in a part of Java which has been comparatively inaccessible has been stored in the ear in local warehouses for many years. The stores thus accumulated in 100 years amount to 100,000,000 kg. of rice. A road has now been built into the region, and Jansen's research has demonstrated that there has been very little if any loss in vitamin and ferment content of the rice or in digestibility.

Nederlandsch Tijdschrift v. Geneeskunde, Amsterdam

1: 2001-2080 (May 12) 1923

Blood Picture in Tertian Malaria. Woensdregt and van Dam.—p. 2002.
Isohemagglutinins in Cancer. Wassink et al.—p. 2011.
Pathogenesis of "Brittle-Bone Disease." G. C. Bolten.—p. 2015.
Examination of the Left Eye. H. K. Hattink.—p. 2019.
Persisting Migraine in Young Man. A. Q. van Braam Houckgeest.—p. 2021.
Future of the Practice of Medicine. H. Koch.—p. 2049.

Ugeskrift for Læger, Copenhagen

85: 373-386 (May 24) 1923

Spontaneous Fluctuations in Wassermann Reactions. J. R. Mørch and T. E. Hess Thaysen.—p. 373.
Fatal Mercurial Poisoning. L. O. Christensen.—p. 379.
Technic of Intravenous Injections. S. M. Saxtorph.—p. 380.